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AMERICAN ANTHROPOLOGIST

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No. 1

ON THE VARIETY OF LINES OF DESCENT REPRESENTED IN A POPULATION

By FRANZ BOAS

THE degree of variation of the individuals composing a population is expressed by means of tables showing the distribution of the values of the particular measurement that is being considered; and the range of variation may be studied by the usual methods, particularly by means of the standard deviation of the series.

In this case the individuals are considered as representatives of the whole series, without any regard to the descent of each. It may therefore well be that, from a biological point of view, two series having the same degree of variability of the component individuals are quite distinct. In one extreme case we may imagine the population as consisting of a number of entirely distinct lines of descent, in which each line represents a particular type. Then by grouping together the individuals of each type, we obtain a series of types different among themselves, which would indicate the heterogeneity of the types that enter into the constitution of the whole population. In the other extreme case we may imagine all the lines of descent composing the population to represent the same ancestral strain. Obviously in this case every single ancestral line would be representative of the whole population, and the averages of all the different lines would be the same.

In other words, in the former case, each line of descent will be characterized by certain traits; in the latter case, all lines of descent will be the same. This latter case would be the result of an absolute inbreeding; and there could no longer be any family resemblance, because all the families would be alike, and in every family all the varying types of the population would be represented. A fraternity would be an adequate representation of the whole people or of a local type.

This case, of course, cannot possibly occur in man. It corresponds to the individuals composing the pure lines of Johannsen, which I should prefer to term "lines of identical descent." In man we can expect only an approach to these conditions, that may develop with continued inbreeding, such as is characteristic of stable rural communities or of primitive tribes in thinly settled countries.

The other extreme is represented by new dense populations, like that of the United States, in which there has not been time for a permeation of the constituent elements. The conditions that develop in a mixed white and negro population will illustrate the characteristics of these conditions. If in such a population whites and negroes do not intermingle, the racial position of each individual will at once be indicated by the fact that all the members of his family will possess the same racial traits, or show a marked resemblance in this respect. On the other hand, in a mulatto population, such differences between members of families cannot exist, but all family strains will show equally effects of mixture. In the former case we have a strong selective mating, in the latter case, none.

Thus it appears that strong family resemblances in a population are indications of the heterogeneity of the composite lines of descent.

The heterogeneity of which I speak here is therefore not an expression of the purity of racial descent, for identity of the lines of descent represented by the families of the population may well be found in cases in which a few ancestors belonged to distinct racial types, but in which the modern population developed by long-continued inbreeding without selective mating. It is rather an

expression of the differences between the various lines of descent represented in a population.

From all I have said, it appears that, in a population in which the lines of descent are the same for each fraternity, we should expect the averages of these fraternities to be identical, provided the fraternities are large enough. In populations in which the lines of descent are quite distinct, we should expect the averages of the fraternities to differ strongly among themselves. In other words, the variability of the average of the fraternities will be a measure of the heterogeneity of the lines of descent.

This value, however, cannot be obtained by direct observation, because in man each fraternity comprises a few individuals only.

We will call the general average of the measurement studied a ; its standard variation, σ ; the number of children in a certain group, m ; and the deviation for each child from the general average, x . Then the average for each family is

$$a = \frac{x_1 + x_2 + \cdots + x_m}{m},$$

and therefore the variability of these averages.

$$s_m^2 = \left[\left(\frac{x_1 + x_2 + \cdots + x_m}{m} \right)^2 \right],$$

where the brackets indicate the process of averaging. If we call the coefficient of fraternal correlation r , we have

$$s_m^2 = \frac{1 + (m - 1)r}{m} \sigma^2.$$

For a very large number of children,

$$s^2 = r\sigma^2 = [xx].$$

The heterogeneity of descent may therefore be determined directly from the two values r and σ .

In calculating the coefficient of fraternal correlation, it is necessary to treat families with 2, 3, 4, etc., children separately, because the weights of the coefficients of correlation obtained from each group are not the same. This is due to the fact that in fraternal

correlations each individual appears a number of times, as he is correlated with each member of the fraternity.

In our series we are dealing with large numbers of cases, so that the value of the coefficient and also the value of σ may be assumed to be known accurately. The coefficient is calculated from the products $x_a x_b$. If f is the number of families, the average product

$$[xx] = \frac{1}{f} \sum \frac{x_1 x_2 + x_1 x_3 + \cdots + x_a x_b + \cdots + x_{m-1} x_m}{\frac{1}{2} m(m-1)}.$$

Its standard error is

$$\epsilon^2 = \left[\left\{ \frac{1}{f} \cdot \sum \frac{x_1 x_2 + x_1 x_3 + \cdots + x_a x_b + \cdots + x_{m-1} x_m}{\frac{1}{2} m(m-1)} - r\sigma^2 \right\}^2 \right].$$

When squaring the sum, the products of the terms representing different families are all independent, and each will be, on the average, $r\sigma^2$. There are $f(f-1)$ products of this type. Therefore

$$\begin{aligned} \epsilon^2 = & \frac{\sum x_a^2 x_b^2 + \sum x_a^2 x_b x_c + \sum x_a x_b x_c x_d + \frac{f(f-1)}{f^2} r^2 \sigma^4 + r^2 \sigma^4}{f^2 \frac{1}{4} m^2 (m-1)^2} \\ & - 2r\sigma^2 \left[\frac{1}{f} \cdot \sum \frac{x_1 x_2 + \cdots + x_a x_b + \cdots + x_{m-1} x_m}{\frac{1}{2} m(m-1)} \right]. \end{aligned}$$

The last average is $r\sigma^2$.

There are $f \frac{m(m-1)}{1 \cdot 2}$ members of the type $x_a^2 x_b^2$

$$\begin{array}{llllll} f m(m-1)(m-2) & & & & & x_a^2 x_b x_c \\ f \frac{m(m-1)(m-2)(m-3)}{4} & & & & & x_a x_b x_c x_d \end{array}$$

Therefore

$$\begin{aligned} \epsilon^2 = & \frac{2[x_a^2 x_b^2] + 4(m-2)[x_a^2 x_b x_c] + (m-2)(m-3)[x_a x_b x_c x_d]}{f m(m-1)} - \frac{r^2 \sigma^4}{f} \\ [x_a^2 x_b^2] = & r^2 [x_a^4] + (1-r^2) \sigma^2 [x_a^2] \\ = & (1+2r^2) \sigma^4 \end{aligned}$$

$$\begin{aligned}
 [x_a^2 x_b x_c] &= \frac{r}{1+r} [x_a^2 x_b (x_a + x_b)] \\
 &= \frac{r}{1+r} ([x_a^3 x_b] + [x_a^2 x_b^2]) \\
 &= \frac{r}{1+r} (r[x_a^4] + (1+2r^2)\sigma^4) \\
 &= r(1+2r)\sigma^4
 \end{aligned}$$

$$\begin{aligned}
 [x_a x_b x_c x_d] &= \frac{r}{1+2r} [x_a x_b x_c (x_a + x_b + x_c)] \\
 &= 3r^2 \sigma^4
 \end{aligned}$$

By substitution,

$$\begin{aligned}
 \epsilon^2 &= \frac{2(1+2r^2)+4(m-2)(r+2r^2)+(m-2)(m-3)3r^2-m(m-1)r^2}{fm(m-1)} \sigma^4 \\
 &= \frac{1+2(m-2)r+(m^2-3m+3)r^2}{f \frac{m(m-1)}{2}} \sigma^4.
 \end{aligned}$$

If we designate the total number of individuals $fm = n$,

$$\epsilon^2 = \frac{2}{m-1} \cdot \frac{1+2(m-2)r+(m^2-3m+3)r^2}{n} \sigma^4.$$

From this we obtain for various families the following values of ϵ^2 :

For 2 children.....	$\frac{2}{1} \frac{1+r^2}{n} \sigma^4$
“ 3 “	$\frac{2}{2} \frac{1+2r+3r^2}{n} \sigma^4$
“ 4 “	$\frac{2}{3} \frac{1+4r+7r^2}{n} \sigma^4$
“ 5 “	$\frac{2}{4} \frac{1+6r+13r^2}{n} \sigma^4$
“ 6 “	$\frac{2}{5} \frac{1+8r+21r^2}{n} \sigma^4$
“ 7 “	$\frac{2}{6} \frac{1+10r+31r^2}{n} \sigma^4$

For values of r , this gives the following values for $\frac{n\epsilon^2}{\sigma^4}$:

<i>r</i>	0.00	0.10	0.20	0.30	0.32	0.34	0.36	0.38	0.40	0.42	0.44	0.46	0.48	0.50
2 children...	2.00	2.02	2.08	2.18	2.20	2.23	2.26	2.29	2.32	2.35	2.39	2.42	2.46	2.50
3 " ...	1.00	1.23	1.52	1.87	1.95	2.03	2.11	2.19	2.28	2.37	2.46	2.55	2.65	2.75
4 " ...	.67	.98	1.39	1.89	2.00	2.11	2.23	2.35	2.48	2.61	2.76	2.88	3.02	3.17
5 " ...	.50	.86	1.36	1.98	2.12	2.27	2.42	2.58	2.74	2.90	3.08	3.25	3.44	3.62
6 " ...	.40	.80	1.38	2.12	2.28	2.46	2.64	2.83	3.02	3.22	3.44	3.65	3.87	4.10
7 " ...	.33	.77	1.41	2.26	2.46	2.66	2.87	3.09	3.32	3.56	3.80	4.05	4.31	4.58

From these may be derived the following relative weights:

<i>r</i>	0.00	0.10	0.20	0.30	0.32	0.34	0.36	0.38	0.40	0.42	0.44	0.46	0.48	0.50
2 children...	50	49	48	46	45	45	44	44	43	43	42	41	41	40
3 " ...	100	81	66	53	51	49	47	46	44	42	41	39	38	36
4 " ...	150	102	72	53	50	47	45	43	40	38	36	35	33	31
5 " ...	200	116	74	50	47	44	41	39	37	34	32	31	29	28
6 " ...	250	125	72	47	44	41	38	35	33	31	29	27	26	24
7 " ...	300	130	71	44	41	38	35	32	30	28	26	25	23	22

I have computed, according to this method, the correlations for several nationalities. The material is the same as that on which my reports on the "Changes in Bodily Forms of Immigrants" is based.¹ I have computed the coefficients of fraternal correlation for the cephalic index, assuming the same correction for all children which I developed in the book just referred to; namely, a decrease of the cephalic index of 0.14 unit per year until the twentieth year is reached; and a reduction of females to male values by assuming from 17 years on a difference of 0.5 unit, the men being more long-headed than the women.

The actual calculation was made according to the formula

$$\Sigma xx = \frac{1}{2} \{ (\Sigma x)^2 - \Sigma x^2 \}.$$

SQUARES OF STANDARD DEVIATION OF *xx*.

No. of Children in Family	Bohemian			Central Italian		
	No. of Families	Variation of <i>xx</i>		No. of Families	Variation of <i>xx</i>	
		Observation	Theory		Observation	Theory
2.....	253	217	183	193	187	209
3.....	94	116	131	108	94	147
4.....	52	93	111	62	105	125
5.....	16	96	100	30	174	112
6.....	5	31	94	17	50	80

¹ *Changes in Bodily Form of Descendants of Immigrants* (final report). Columbia University Press, 1912.

I have also calculated for two types the standard variations of the values xx and their averages, in order to give a means of comparison of the theoretical values given above and the empirical values. The variation of xx is of course strongly skew.

Following are the results for a few populations:

	[xx]	s
Bohemians.....	5.60	± 2.37
Central Italians.....	5.72	± 2.39
(Potenza).....	(5.83)	(± 2.41)
East European Jews.....	5.25	$\pm 2.29^*$
Worcester, Mass.....	5.46	± 2.36
Scotch.....	4.72	± 2.17

* Calculated from 255 families of 2 children.

It appears from these few samples that the variation in lines of descent in Europe seems to be very uniform. The selection of Potenza, a smaller district of Central Italy, does not show a decrease of the variability of lines of descent.

Theoretically the interesting and important question would be, how low the values of the heterogeneity of lines of descent may be in extreme cases. As indicated before, it seems very likely that, with long-continued inbreeding without selective mating, the average for the families might be very much alike.

I have no material from European villages that would lend itself to a test of this problem; and reliable material from primitive tribes is difficult to obtain, because in most cases the actual biological relationships are uncertain. I am indebted to Professor Eugen Fischer for data on the Bastards of South Africa that were not published in his volume.¹ I have treated them in the same manner as the European material. There are 75 individuals in all.

4 families of 2 children.				
4	"	"	3	"
3	"	"	4	"
2	"	"	5	"
3	"	"	6	"
1 family	"	"	7	"
1	"	"	8	"

¹ *Die Rehobother Bastards*. Jena, 1913.

The observations give an average for the whole series of 75.9; $\sigma^2 = 6.5$.

$$\text{Bastards } [xx] = 1.6 \quad s = \pm 1.26$$

In this series, in which descent is probably in the great majority of cases reliable, and in which we have long-continued inbreeding, we have therefore much greater uniformity of the various family averages. The calculation of observations collected in 1892 among the eastern Chippewa of Canada gives similar results. The data were collected among the Missisauga and other bands north of Lake Huron. I have the following family groups at my disposal:

	Missisauga	Other Chippewa
Families of 2 children.....	38	23
“ “ 3 “	10	6
“ “ 4 “	6	4
“ “ 5 “	2	3
“ “ 6 “	1	—

There are 146 and 95 individuals respectively. The series give the following results:

Missisauga $a = 80.4 \quad \sigma^2 = 12.0 \quad [xx] = 2.40 \quad s = \pm 1.47$

Other Chippewa $82.1 \quad 14.1 \quad 3.14 \quad s = \pm 1.77$

In both cases we have populations containing many half-breeds, but, on the whole, an old inbred mixture.

The results given here might be doubted, on account of the uncertainty of parentage among Indians. However, this condition is always clearly expressed in the coefficients of correlation obtaining between father and child. There is hardly ever a doubt as to the relation between child and mother, so that this correlation can be taken as nearly correct. I have calculated for both groups of Chippewa the correlations between parents and children. I give the values of $[xy]$ and r , and the number of pairs from which they are derived.

	Father and Children.			Mother and Children.		
	$[xy]$	r		$[xy]$	r	
Missisauga.....	0.65	0.05	(30)	1.23	0.10	(69)
Other Chippewa.....	3.30	0.24	(66)	2.50	0.16	(48)

The correlations between mother and child are low, and on the average not higher than those of the fathers. Even if we might consider the value as a little too low, we are justified in concluding that the correlations are much lower than in European populations. It is easy to see that the correlations between parents and children will also be the lower, the more uniform the lines composing the population. This point has been made by Johannsen in his "Exakte Erblchkeitslehre."

The square standard variation of individuals composing a family, *i. e.*, of the fraternities, is a correlate of the variability of family lines, and must average $\sigma^2(1 - r)$. In the following table I give the variability of the fraternities s_f , and, for the sake of comparison, repeat the variabilities of the family lines s .

Bohemians.....	$s_f = \pm 2.61$	$s = \pm 2.37$
Central Italians.....	± 2.72	± 2.39
(Potenza).....	± 2.52	± 2.41
East European Jews.....	± 2.52	± 2.29
Worcester, Mass.....	± 2.36	± 2.36
Scotch.....	± 2.66	± 2.17
Bastards.....	± 2.52	± 1.26
Missisauga.....	± 3.10	± 1.47
Other Chippewa.....	± 3.32	± 1.77

I presume the high values among the Chippewa are due largely to the great difference in type between the component elements of the mixed population, the Irish and French being long-headed, the Chippewa short-headed. It is possible, however, that inaccuracy of information regarding the actual relationships accounts for part of these phenomena.

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DYNAMOMETRIC OBSERVATIONS AMONG VARIOUS PEOPLES

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THE following article is a brief abstract of a paper originally intended for a French anthropological magazine, but the publication of it had to be postponed indefinitely on account of the international war.

All the tests of muscular force—pressure of hands and traction—the figures of which are given in the succeeding tables, were made by myself during years of travel between 1885 and 1892. The instrument used was a Mathieu dynamometer (Paris), according to the instructions and with the precautions recommended by French anthropologists. Altogether 622 subjects (440 men, 182 women) were tested. They belong to North and South American Indian tribes, Indonesians, South Sea Islanders and other different peoples, the respective numbers and distribution of which are given in the following tables.

The figures of force tests of nearly one fourth of these subjects were published elsewhere many years ago, partly together with a description of their somatological characteristics.¹ As however neither an attempt at comparison of the different ethnic groups nor an analysis were made on these occasions, I will unite in the present abstract these figures with the more numerous data obtained later and elsewhere. With the exception of two albino women, a Solorese and a Tahitian, all my subjects are normal and healthy. Their presumable age varies in the main from 16 to 45 years, the majority being perhaps between 25 and 30 years old. The very few old people among my subjects are not excluded from the average numbers on the ground that comparatively their mus-

¹ "Observations anthropologiques recueillies dans la Guyane et le Venezuela" (*Revue d'Anthropologie*, 16^e année, 3^e série, tome II, 1887) and *Notices anthropologiques du Musée Royal d'Ethnographie de Leyde*, No. 2, Singalais, Leiden, 1886.

cular force is hardly or not at all inferior to the mean force of the younger subjects. The figures of force are given in kilograms.

The height of stature is, in most cases, based upon my own measurements. As however the height of stature of *every* subject whose muscular force was tested, was not measured by myself, in such cases the average height of the whole group as I found it, regardless of force tests, was taken. In other cases the stature was computed partly from my own observations and partly from those obtained by other anthropologists. This applies to the Iroquois, Caribs, and Australians. The figures of stature are in millimeters.

Dynamometric observations among colored races are, as far as I know, comparatively scarce, and moreover those few travelers who made tests did not always use the same kind of instrument. Among this sort of observations those of Dr. Aleš Hrdlička,¹ who used a Collin dynamometer, identical with that of Mathieu, are of particular importance and afford abundant material for comparison with my own data.

I. NORTH AMERICAN INDIANS

I tested the 57 Iroquois of the succeeding table on the Tuscarora reservation in northwestern New York and at Caughnawaga in Canada, both in 1886. At the former locality 4 Seneca, 1 Onondaga, and 33 Tuscarora were tested; at the latter locality 19 Mohawk. The Indians of Caughnawaga were most probably all of mixed blood; those of Tuscarora reservation were also largely mixed, but much less, and there were presumably several full-bloods among them. All the other Indians were tested in 1888, while on duty with the Hemenway Southwestern Archaeological Expedition.

In the present paper no distinction is made between the different Iroquois tribes. The average figures are those of all the Iroquois taken together. As I tested only 3 Yuma Indians, I have incorporated them here with the Maricopa, a closely related tribe. The succeeding table presents a résumé of my observations among 251 Indians of the United States and Canada.

¹ "Physiological and Medical Observations among the Indians of Southwestern United States and Northern Mexico" (*Bulletin 34, Bur. Am. Ethn.*, Washington, 1908.)

Tribe	Number of Subjects	Pressure				Traction		Average Height of Stature
		Averages		Maxima		Aver- ages	Max- ima	
		Right Hand	Left Hand	Right Hand	Left Hand			
Iroquois.....	{ 34 men	53.1	49.8	70.0	68.0	—	—	1,727
	{ 23 women	32.0	29.4	55.0	45.0	—	—	1,585
Pimas.....	{ 75 men	37.6	35.0	51.0	48.0	18.0	30.0	1,695
	{ 42 women	25.0	24.0	35.0	35.0	12.5	21.0	1,551
Papagos.....	{ 17 men	42.0	38.0	54.0	52.0	21.3	35.0	1,695
	{ 3 women	27.6	27.3	30.0	31.0	14.6	16.0	1,598
Maricopas.....	{ 28 men	44.3	39.1	59.0	53.0	23.7	37.0	1,711
	{ 16 women	31.8	26.8	45.0	36.0	15.4	22.0	1,604
Zuñis.....	{ 13 men	40.4	36.1	54.0	47.0	19.0	25.0	1,644

Among these 167 men of the different tribes 19.1 per cent. have a stronger left than right hand; among the 84 women 27.3 per cent. The average difference in force of pressure between the right and left hand among all the male Indians taken together is 2.1 kg.; among all the female Indians 2.0 kg. The average difference of pressure force between all the North American men and women is 13.2 kg. for the right and 13.1 kg. for the left hand.

The average female force of pressure in relation to the male force (= 100) is 67.9 per cent. for the right and 66.4 per cent. for the left hand.

The average difference of force of traction between all the men and women (with the exception of the Iroquois) is 6.0 kg. The average female force of traction in relation to the male force (= 100) is 69.5 per cent.

II. SOUTH AMERICAN INDIANS

The Arawaks and Caribs of the succeeding table are all natives of Surinam with the exception of four subjects from British Guiana which I tested in London and incorporated with the latter tribe on account of their small number. These are 1 Macusi and 1 Arucuna man and 2 Akawoi women, all belonging to the great Carib family. The Indians of Aguasai are either descendants of the Chayma or of the Cumanagoto tribe in northeastern Venezuela. The Guayquerics, largely mixed with white and negro blood, are coast Indians of the same region. The force, of pressure only, of these 60 different Indians may be summarized as follows.

Tribe	Number of Subjects	Pressure				Average Height of Stature
		Averages		Maxima		
		Right Hand	Left Hand	Right Hand	Left Hand	
Arawaks.....	{ 16 men	38.2	35.2	55.0	49.0	1,550
	{ 12 women	25.1	22.2	33.0	33.0	1,470
Caribs.....	{ 11 men	33.2	31.7	49.0	43.0	1,572
	{ 13 women	22.6	21.1	30.0	29.0	1,457
Aguasai Indians.....	4 men	36.2	33.2	40.0	37.0	1,567
Guayqueries.....	4 men	40.7	40.5	46.0	46.0	1,655

Taking the 35 male Indians together, we find that in 17.1 per cent. the left hand is the stronger; among the 25 female Indians the left hand is stronger in 20 per cent.

The average difference in pressure force between the right and left hand is 2.3 kg. among the men and 2.2 kg. among the women.

The average difference of pressure force between all the men and women is 13.0 kg. for the right hand and 12.9 kg. for the left.

The average female force of pressure in relation to the male force (= 100) is 64.6 per cent. for the right hand and 66.4 per cent. for the left hand.

III. INDONESIANS

The following tables summarize the results of my observations among 206 natives of the Netherlands Indian Archipelago, namely, of Celebes, Timor, and adjacent islands. In the first table the averages of pressure and traction for the various peoples are given; in the second table a few individual test figures.

Tribe or People	Number of Subjects	Pressure				Traction		Average Height of Stature
		Averages		Maxima		Averages	Maxima	
		Right Hand	Left Hand	Right Hand	Left Hand			
Macassars.....	9 men	36.5	34.8	52.0	50.0	—	—	1,615
Buginese.....	8 "	36.1	33.8	52.0	43.0	—	—	1,568
Timorese.....	{ 29 "	38.8	35.8	56.0	53.0	14.7	27.0	1,597
	{ 12 women	25.1	24.8	34.0	30.0	8.6	17.0	1,496
Atuli Helong...	11 men	38.7	36.0	55.0	47.0	15.0	34.0	1,641
Belonese.....	8 "	32.1	31.2	39.0	41.0	14.7	22.0	1,619
Rotinese.....	{ 32 "	38.0	34.9	54.0	45.0	15.2	26.0	1,605
	{ 19 women	26.6	24.7	44.0	44.0	11.8	20.0	1,483
Solorese.....	{ 9 men	40.0	38.2	50.0	50.0	18.0	25.0	1,577
	{ 3 women	23.0	19.3	33.0	22.0	13.3	14.0	1,409
Sikanese.....	13 men	34.3	30.4	46.0	49.0	15.8	28.0	1,624
Sumbanese....	{ 29 "	39.1	36.8	54.0	52.0	16.5	25.0	1,650
	{ 11 women	25.1	22.8	31.0	27.0	14.2	19.0	1,526
Savunese.....	8 men	38.5	32.5	50.0	47.0	19.0	24.0	1,569

Tribe or People	Number of Subjects	Pressure		Traction	Stature
		Right Hand	Left Hand		
Macassar.....	1 woman	18.0	15.0	—	1,540
Atuli Helong.....	1 "	30.0	35.0	5.0	1,540
Atuli Helong.....	1 "	35.0	34.0	—	1,690
Lionese.....	1 man	32.0	32.0	20.0	1,583
Endenese.....	1 "	22.0	21.0	8.0	1,525

Of these 158 male Indonesians 13.2 per cent. are stronger left; in 22.9 per cent. of the women (48 subjects) the left hand is the stronger. The average difference in force of pressure between the right and left hand of all the men is 2.9 kg.; of all the women 1.5 kg. On the average the difference of pressure between all the Indonesian men and women is 13.2 kg. for the right hand and 11.8 kg. for the left hand.

The average female force of pressure in relation to the male force (= 100) is 66 per cent. for the right and 67.2 per cent. for the left hand. The average difference of force of traction between all the male and female Indonesians being 4.2 kg., the average female traction force in relation to that of the male force (= 100) is 71.6 per cent.

IV. POLYNESIANS

The first of the succeeding tables gives the averages and maxima of force test figures among different groups of Polynesians; the second contains a certain number of individual figures. The inferences however are based—as with the Indonesian—upon all the cases combined.

People	Number of Subjects	Pressure				Traction		Average Height of Stature
		Averages		Maxima		Aver- ages	Max- ima	
		Right Hand	Left Hand	Right Hand	Left Hand			
Tongans	9 men	52.7	47.5	64.0	55.0	20.6	36.0	1,772
Tahitians	11 " {	51.9	47.9	63.0	55.0	18.4	26.0	1,728
	12 women	31.0	28.2	43.0	40.0	14.8	22.0	1,597
Tuamotu	5 men	52.2	50.4	73.0	63.0	22.6	28.0	1,724
Tubuai	3 "	64.0	61.6	75.0	77.0	23.3	30.0	1,725
Cook Island . . .	4 "	46.0	44.5	55.0	57.0	16.0	22.0	1,756
Easter Island . .	3 "	57.0	54.6	71.0	73.0	19.0	21.0	1,743

People	Number of Subjects	Pressure		Traction	Stature
		Right Hand	Left Hand		
Tonga.....	{ 1 woman	43.0	38.0	20.0	1,627
	{ 1 "	30.0	27.0	13.0	1,660
Tuamotu.....	1 "	32.0	30.0	16.0	1,706
Tubuai.....	1 "	24.0	24.0	15.0	1,648
Half-breeds.....	{ 1 "	30.0	26.0	19.0	1,604
	{ 1 "	33.0	31.0	20.0	1,558
Gilbert.....	1 man	58.0	61.0	17.0	1,700

Among these 36 various Polynesian men 19.4 per cent. have a stronger left than right hand; among these 18 different women 5.5 per cent.

On the average the difference of pressure between the right and left hand is 3.4 kg. among all the Polynesian males and 2.7 kg. among all the females.

The average difference of pressure force between the Polynesian men and women is 21.9 kg. for the right hand and 21.2 for the left hand, which gives for the female force compared with that of the males (= 100) the ratio of 58.7 per cent. for the right and 57.3 per cent. for the left hand.

The average difference of traction force between the men and women is 4.2 kg. The average female force of traction in relation to the male force (= 100) is 78.7 per cent.

V. VARIOUS PEOPLES

This group contains most heterogeneous elements pertaining to five or six different races. The Carbugres or Carbugre Indians are a mixed breed of Indian and Negro. They were tested by me in Surinam, like the Bush Negroes. The natives of Malikula and those of New Ireland (Neu Mecklenburg), both belonging to the Melaneseans, were tested at Nukualofa on Tongatabu island, where they worked as plantation coolies. The Australians, pertaining to a Queensland tribe, I tested at Hamilton near Brisbane. The left hand of the second subject showed signs of traumatic lesion. For this reason its figure of pressure, as well as of traction, are certainly far below the average. The Annamites, all from Cochinchina, are escaped convicts from French Guiana. I tested them in prison at

Paramaribo. The Hindus, plantation coolies in Surinam, where I tested them, all hailed from northern India. The Singalese were tested in London in 1886. They belonged to a troop exhibited by Hagenbeck in Agricultural Hall. Some of these are apparently mixed with Tamil. These people came from the neighborhood of Colombo and Kandy. Of the succeeding tables the first contains the average figures, the second individual figures of which latter, on account of their small number, no averages can be given.

Tribe or People	Number of Subjects	Pressure				Traction		Average Height of Stature
		Averages		Maxima		Averages	Maxima	
		Right Hand	Left Hand	Right Hand	Left Hand			
Carbugres	{ 4 men	39.0	35.0	41.0	39.0	—	—	1,585
	{ 4 women	24.2	24.0	30.0	31.0	—	—	1,440
Bush Negroes. .	{ 5 men	52.2	49.4	61.0	57.0	—	—	1,609
	{ 3 women	30.0	28.3	35.0	30.0	—	—	1,535
Malikula Isl. . .	3 men	46.3	38.0	55.0	45.0	24.3	30.0	1,563
Annamites. . . .	7 "	37.0	37.0	51.0	52.0	—	—	1,592
Hindus.	6 "	33.5	30.8	39.0	36.0	—	—	1,653
Singalese.	{ 11 "	41.8	39.0	52.0	48.0	—	—	1,599
	{ 4 women	24.0	22.2	26.0	25.0	—	—	1,453

People	Subjects	Pressure		Traction	Stature
		Right Hand	Left Hand		
New Irelanders.....	{ No. 1 man	50.0	42.0	30.0	1,508
	{ No. 2 "	43.0	44.0	22.0	1,553
Australians.....	{ No. 1 "	58.0	56.0	24.0	{ 1,690
	{ No. 2 "	59.0	34.0	16.0	

The few inferences we can draw from these two tables are mainly the following.

Of the 44 males belonging to these various people 7 are stronger left than right; of the 7 females 1 has a stronger left hand, or, in percentages, respectively 15.9 and 14.2.

The average difference in force of pressure between the right and left hand is among the

	Carbugres	Bush Negroes	Singalese
Men.....	4.0	2.8	2.8
Women.....	0.2	1.7	1.8

The average difference in pressure between the men and women is among the

	Carbugres	Bush Negroes	Singalese
Right hand.....	14.8	22.2	17.8
Left hand.....	11.0	21.1	16.8

The average female force of pressure in relation to the male force (= 100) is as follows among those groups:

	Carbugres	Bush Negroes	Singalese
Right hand.....	62.0	57.4	57.6 per cent.
Left hand.....	68.5	57.2	56.9 per cent.

SUMMARY OF THE PRINCIPAL GENERAL RESULTS

On the whole, and mostly in the average, the tallest people, tribally and individually, have the greatest muscular potency. This well-established law is, with a few exceptions, once more confirmed by my results. It should be borne in mind, however, that this fact is more the consequence of the larger hand in people of high stature than of anything else. The individual maxima of force, however, do not always correspond with the individual maxima of stature in the different ethnic groups. The maxima of force, either of pressure or of traction, are not always met with in the same subject; in other words, a certain subject may indicate the maximum force for the right hand, another for the left, and still another subject for traction.

Judging from the averages of all the various ethnic groups, the male Tubuai islanders and Iroquois, and the female Iroquois and Tahitians have the greatest force of pressure. The maximum force of traction is found among the Tubuai men and the male Maricopa; among the women the Maricopa have also the highest figure, the Tahitians coming next.

The highest percentage of left hand force prevailing over that of the right hand is found among the North American Indian women. If we take all the various ethnic groups together, we find that there are more women having a stronger left hand than men, the total percentages being respectively 16.7 and 22.5. The greatest average sexual difference in pressure force is found among the Bush Negroes

and Polynesians, with very similar figures; the smallest difference among the North and South American Indians and Indonesians, for the right hand at least, also with very similar figures.

As far as can be ascertained, the average sexual difference of force of pressure, in all the ethnic groups, is less than the average force of traction. The female force of pressure, for both hands, represents, in round figures, 62 per cent. of the male force (the latter = 100); the female force of traction, equally in round figures, represents 73 per cent. of the male force.

Compared with the average male force of pressure (= 100), the North American Indian women are the strongest, and the Singalese women the weakest of their sex in all the groups. The average pressure force of the Polynesian females, in comparison with that of the males (= 100), shows also a low figure. This latter result is contrary to expectation, the more so as the Polynesian female force of traction is proportionately considerable. The test of a greater number of Polynesians would probably give a different result.

Taking all the 622 subjects together, the female muscular potency compared, on the whole, very favorably with that of the male. This is a further proof—if such were needed—of the widespread fallacy about the bodily weakness of the female sex.

KOBE, JAPAN.

INHERITANCE BY MAGIC

By A. L. KROEBER

MODERN science has done much to study and elucidate savage psychology and reasoning, folk-ways and mores, primitive methods of thought. This essay is written as an analysis of modern scientific tendency in the light of primitive and naïve thinking.

That the idea of evolution is an old one, far antedating Darwin, is a commonplace. But it is perhaps not yet generally recognized even by biologists how truly ancient and really widespread—in fact, almost universal in the history of human thought—the idea of cosmic evolution has been.

Among the untutored and isolated natives of Samoa, one version of the story of origins begins with fire and water, who married and from whom sprang the earth, rocks, trees, and everything. Then the cuttlefish—representative of a previous order of existence, in Polynesian mythology,—fought with the fire and was beaten. The fire fought with the rocks—its progeny—and the rocks conquered. The large rocks fought with the small stones; the small conquered. The small stones fought with the grass, and the grass won. The grass fought with the trees: it was beaten. The creepers fought with the trees and conquered. The creepers rotted, swarmed with maggots, and from maggots there grew to be men. The evolutionary idea is particularly apparent in its emphasis on the factors of competition and superseding.

Among the natives of Hawaii, in a long duration of primeval night, a progressive series of eight periods was recognized, in which there appear, or literally “are born,” the following in order:

First, worms, corals, shells, seaweed, kelp, sedge, grass.

Second, insects and birds.

Third, trees, jellyfish, fishes, whales.

Fourth, turtles and cultivable plants.

Fifth, pigs and human arts.

Sixth, mice and porpoises.

Seventh, visions, sounds, thoughts, and sayings.

Eighth, man.

Even this skeleton indicates the mystic elements contained in the myth; but its scientific adumbration, at least as great as that of the book of Genesis, is also evident.

The Luiseño Indians of California tell that "the first that came or appeared" were Solitariness and Emptiness. Then Being and Existence found themselves there. Then Whitish Gray and Boring Lowering existed. Then Sky and Earth were born. From them were born in order these pairs: Hair and Cane, of ceremonial significance; Basket and Throwing Stick, also of ritualistic implications; Iron Oxide and Pond Scum, used as paint for religious purposes. Then follow Water and Mud; Rose and Blackberry; Tussock Grass and Sedge; Salt Grass; Blood and Menstruation. Then came forth the hills, trees, and stones. Then followed more births: Badger; Buzzard; Ball Lightning or Meteor, a spirit; the underground Water Monster; Ghost; Yellow Pine and Cottonwood, ceremonially symbolic; Booth and Votive Offerings, also ritual; Mountain Ash; Isla, a plant; Brake Fern. Next there occurred, the births of the Black Rattlesnake, the Red Rattlesnake, the Spider, the Tarantula or Tarantula-Hawk, the Raven, the Bear, and the Sting Ray, all messengers and avengers of the principal spirit to whom ceremonies relate; and finally these ritualistic objects: the Winnowing Basket; the Mortar and Stone Bowl; a Fish and Urine. These beings,—animals, plants, and objects,—later became the first people of the human species, from whom modern tribes are descended. The religious and mythological imports predominate in this story also; but a quasi-scientific evolutionary scheme of the origins of the world and life is indisputable.

To whatever part of the earth we turn, similar inclinations are apparent. The pre-mediaeval Shinto mythology of Japan, the Greek cosmogony of Hesiod, the ruder and more fragmentary one of ancient Egypt, even the crudely specialized traditions of the Australian Blackfellows, all evince a more or less complete working

out of the same thought. It underlies in a way the Hindu conception of transmigration, and has thus become a mental influence among the hundreds of millions to whom Buddhism has spread. The American Indians almost universally assume a former period when men were animals, or beings were undifferentiated between men and animals or objects; and the germ of the evolutionary idea is of course present in this assumption.

In the beginnings of western science, the early Greek philosophers unanimously took for granted a gradual development. Their search was for the substance that would result in the most plausible scheme of growth of things when postulated as primary and basic. They began with water, air, and fire; became less concrete with four elements; more immaterial still with the half abstract notions of mind, number, or being; and finally settled down to either the postulate of original ideas or original atoms. But the concept of natural unfolding, an inherent development, a "rolling out" of some sort, was rarely denied or wholly abandoned. The evolutionistic inclinations of Lucretius and his masters, random though they be, are well known; and the philosophical speculation and anticipatory scientific reasoning of the ancients, with particular reference to the development of the organic, in which they were far less interested than in that of the physical world and of man, have been thoroughly described and thoughtfully weighed by Osborn in his "From the Greeks to Darwin."

In fact, the human mind in thousands of years appears to have been able to make use of but two ideas in explaining to itself the origin of the world: that of evolution and that of creation, as it has lately been customary to name them. Both are obviously derived from analogies with concrete events which every human being witnesses constantly: the process of birth and growth, organic, and the process of making or manufacture as exemplified by human hands. Many nations have drawn on both acts in formulating their cosmogonies; some have partly obscured them by literary and ritualistic intertwinings; but in general the evolutionary idea of growth has perhaps equalled in strength that of creation. Only one people, the Jews, through their personalizing genius and anthro-

pocentric bent, turned, for a time and over a part of this planet, the balance in the opposite direction. Even in their thought there are traces of the more usual concept: the association with animals in Eden; the speaking and four-footed serpent—half animal, half man; the order of events in creation, which, though it distinctly does not fit the conclusions of our astronomy, geology, and palaeontology, does show some attempts at a successive and progressive sequence. The ramification of Judaism into Christianity and Mohammedanism, and the vitality of the principles assumed by them in common, gave to the idea of creation a fifteen hundred years' prevalence in the western world, which, as it crystallized, lent to the point of view an appearance of permanent exclusiveness long after new forces had undermined it within. But so far as human civilization as a whole is concerned, the idea of evolution, in dim or definite form, has always maintained itself in some measure and often had the upper hand.

It was then inevitable that science should sooner or later make use of this concept, just as it appropriated to itself the essentially half mythological ideas of the atom and of ether. What Lamarck did a century ago was merely to connect this age-old unscientifically founded idea with the accumulating body of organized knowledge. What he did not do, was to try seriously to explain evolution by any accurately analyzed process. ¶¶

That the evolutionary concept should be specifically applied to organic life was inevitable as soon as the manifestations of life began to be viewed with appreciable interest. As long as the world, like a child in a menagerie, was content to marvel at the forms and activities of life, and to be directly emotionally impressed by them, nothing resulted but art, literature, and mythology. When examination was undertaken, some scheme was bound to eventuate.

In the day of Lamarck, the impress of observation was still overpoweringly fresh. Observations had revealed an extraordinary degree of adaptation in animals and plants. While organs and actions were merely seen, these excited surprise countless times. When they were watched, a clear relation between form and use often became manifest at once, leading to the surmise that other

as yet unexplained forms and uses might be similarly connected. The following out of such problems grew into a fascinating pursuit, particularly as every step involved an easy entry into entirely unexplored regions without a new method of procedure. It is no wonder, therefore, that the main effort of biologists of a hundred years ago was devoted to the exposition and following out of adaptations. The real interest was in these, and not in any explanation of how the forms of life came to be. Showing the function of a peculiarity of an organism still took precedence over showing how it actually originated or might have originated.

Of course, effort was not entirely confined to these recurrent revels. Lamarck certainly stressed the fact of evolution as much as possible. But what process was available to operate with? Heredity, naturally, was patent. That children usually resemble parents, that sheep bear lambs, and lions give birth to lions and not tigers, the rudest savage of thousands of years ago knew. But heredity, which maintains similarity and preserves, is in its nature opposed to the change inherent in evolution or development. It obviously gives order and fixity to the phenomena of life; it cannot in itself explain progress or alteration. Some other factor or force is required. What could this be? As always, analogy was first resorted to.

Everyone knows from his personal experience that practice makes perfect. Everyone knows that use strengthens and develops the blacksmith's arms, the musicians's fingers, the sailor's hands, the porter's back. This principle was applied. The animal that runs or butts or tears or swims, acquires or tends to acquire legs, horns, claws, or fins, irrespective of what it may have had before, just as one can see the blacksmith acquiring muscle, and the pianist spread and agility of fingers, from year to year. What can go on for ten years might go on for ten thousand, with a thousand times the effect.

And why not? No one knew anything to the contrary. No one had any ground for dispute, except from generic hostility of a theological or professional kind. As is well known, ninety-nine of every hundred educated civilized people today, with all their

having the phrase "survival of the fittest" in their mouths, still believe, unless they have had exceptional training in biology, that evolution takes place in this way. It is no wonder that the pioneer Lamarck did the same.

Of course the inevitable weakness of analogy was present. The individual is not the race. What is true of one might or might not be true of the other.¹ But it is also inevitable that purely negative reasoning does not avail against positive. One gets nowhere with it. Not until a positive scheme able to replace the existing one was provided, was there the least chance, or the least profit, in harping on the fundamental weakness of the analogy that underlay the Lamarckian explanation of evolution. It is true that for half a century the Lamarckian principles were largely ignored or denied; but they were not critically assailed.

The new scheme was provided by Darwin, and it speaks for its positive value, and its usefulness, that the man on the street still thinks of Darwin not as the propounder of a new explanation of evolution, but as the discoverer of evolution itself.

Darwin left aside, as unnecessary for his evolutionary process, the ancient idea of use development. He kept, of course, as evolutionists always must, the other Lamarckian factor of heredity. He added to it two others which had not been made use of before: first, individual variability; and second, competition or the struggle

¹ That Lamarck did not hesitate at completely ignoring the difference between the organism and the race, and that in the most unconcerned manner, is clear from his statement of his two fundamental laws in their first form, in the *Philosophie Zoologique*, part one, chapter seven:—

"Première Loi:

"Dans tout animal qui n'a point dépassé le terme de ses développements, l'emploi plus fréquent et soutenu d'un organe quelconque, fortifie peu à peu cet organe, le développe, l'agrandit, et lui donne une puissance proportionnée à la durée de cet emploi; tandis que le défaut constant d'usage de tel organe, l'affaiblit insensiblement, le détériore, diminue progressivement ses facultés, et finit par le faire disparaître.

"Deuxième Loi:

"Tout ce que la nature a fait acquérir ou perdre aux individus par l'influence des circonstances où leur race se trouve depuis longtemps exposée, et par conséquent par l'influence de l'emploi predominant de tel organe, ou par celle d'un défaut constant d'usage de telle partie, elle le conserve par la génération aux nouveaux individus qui en proviennent, pourvu que les changements acquis soient communs aux deux sexes, ou à ceux qui ont produit ces nouveaux individus."

for existence. The combination of these three elements gave him his process of natural selection,—of which the more widely known phrase, survival of the fittest, is nothing but a more picturesque synonym;—in short, the means by which organic evolution works.

Darwin's achievement consisted in his combination of his three factors into a process. The strength of his position lay in the indisputability of his three factors. Heredity had always been accepted. Variability, though apparently contradictory of heredity, and although still unexplained as to its origins, was equally universal and undeniable. And that competition does and must take place on an enormously important scale, is equally plain. Hence the Darwinian explanation, once the relation of the three factors was made, was unassailable. We can limit the applicability of the explanation; we can find cases which it can be made to fit only with difficulty; we can, and probably shall, find other processes which are also operative; but the world must probably forever believe that natural selection is of some influence in the shaping of life. And Darwin from the whole bent of his mind was not trying to give a history of life, which would unquestionably have been attacked and destroyed at multitudinous points, but to demonstrate the applicability to this history of a universal formula.

Hence it is not remarkable that Darwin, while not seriously employing the older pseudo-process of Lamarck, refused to break with it. With all his originality he was essentially sane with the conservatism of balance; he was producing, not clearing; and the older explanation was not in his way. There was room for both. Darwin's work was to make evolution tangible by proving natural selection. He would have left his course by trying to disprove use inheritance.

At the same time, the world could not always occupy his aloof position. When the fight was over and the principle of selection accepted, the house of science had to be put in order. Two diverse explanations, with nothing in common but the assumption of heredity, were in each other's way. They left an uncertainty which either alone did not produce; and they were bound to irritate as everything which confuses irritates. The next generation was called

to choose between them. Selection, although the full extent of its applicability may be undemonstrable, was certain. It was also new. The older explanation of use inheritance was therefore due for a hostile examination. The only surprise now is that the attack was so long deferred.

It was Weismann who led the onslaught. The destructive nature of his achievement, a stiffness in constructive theorizing, to which he felt impelled, but which resulted only in barren formalities, have led to an undue disrespect for his name which is perhaps strongest among his biological colleagues who can appreciate his technical shortcomings. Without the greatness of Darwin, and an extremist, he was however on fundamentals as clear a thinker as Darwin; and his accomplishment will in the end be rated in proportion. He was the first to take a step that had to be taken.

At the very touch, the Lamarckian structure proved to be absolutely hollow. Experiment failed to produce even a scrap of positive evidence in its favor. Renewed examination demonstrated that there was not a single alleged instance which was more than logically possible. Practically every case of use inheritance was explicable by selection. The case for it came down to the condition so graphically depicted by Ball: "Are we to conclude that use inheritance *plus* selection will modify races, just as Voltaire firmly held that incantations, together with sufficient arsenic, would destroy flocks of sheep?"

Weismann died since the preceding pages were first written. What has been the effect of his career? Superficially, very little. To the world at large he is a second magnitude, a disputative follower of Darwin and opponent of Spencer without the popularizing ability or fame of Huxley and Haeckel. To biologists he is an ultra positivist, who argued with clearness one side of a question which they have grown tired of, and otherwise built up certain theories which scientific manners at times require to be mentioned, but which are singularly thin, unplausible, and barren. And yet his basic idea, that the hereditary substance is totally distinct from the organic body, and that therefore the fate of the individual cannot affect the race, has found the strongest corroboration in a

new branch of biological science whose origin has no connection whatever with the current of thought of which Weismann formed part. If Mendelism rests on anything at all, it rests on the doctrine of the utter separateness of what it calls gamete and zygote. This separateness may be purely conceptual, but it is the only concept which it has yet been possible for anyone to think out that will explain and hold together the looming mass of facts heaped up by genetic observation and experiment. There is an impression among some Mendelists that the greatest accomplishment of their science has been the superseding of Darwinism. With Darwin the ultra-Darwinian Weismann of course would fall too; and this school may not relish any one's believing that one of their fundamental achievements has been the involuntary confirmation by real knowledge of an idea first clearly grasped by a Darwinian theorist. But if the principle of the distinctness of germ and body is basic to Mendelism, it is basic also to Weismannism; and to this extent the newer science has vindicated Weismann.

There was a time not so long ago when many sensible people still thought it desirable to try to prove that the findings of geology and biology were reconcilable with the view that this earth had its beginning in 4004 B.C. At present it is no longer considered profitable even for intelligent clergymen to make this attempt. In fact the best form demands a downright admission, or at most a more or less dignified evasion. What has brought about this change? Certainly not argument. In countries where education prevails, the majority has gone over; and the majority of professional ministers of religion to the educated have had to go over with them. The question in fact is not arguable any more. Whoever wishes to stay with the belated minority, is at liberty to do so; and there is the end to it. No person of understanding with anything else to do will argue the point, because it is plain that whoever believes in the literalness of the Old Testament does so because he wants to and not because the preponderance of evidence forces him that way. On the other hand, once anyone has this predilection, it is childishly easy for him to find arguments in favor of his case, and to emphasize that the evidence against him is not

absolutely complete—as of course it never is against anything. Therefore the recognition that discussion of the subject is no longer fruitful.

It is much the same with the “problem” of use inheritance or acquired heredity, so far as profit is concerned. Whoever falls back on the evidence and the possible ways it may be interpreted, can chase his tail around till doomsday. Many biologists now realize this and refuse very carefully to be drawn into any discussion of the subject. But their motive is different from the reason that keeps them from letting themselves be troubled by the claims of 4004. That is a plain superseded superstition; but acquired heredity is not yet a superstition, it is only a tiresome noise which is taboo in much really high scientific society: just as many perennial social problems are taboo in good social circles not because they are antiquated but because they are disagreeable.

The result is that instead of heredity by acquirement being actively frowned upon and stamped out as a pernicious heresy, it is evaded; and the consequence of this convenient shutting of the eyes is that whenever a biologist is mentally youthful, or temperamentally belated, or over-conscientious, or inefficient from over-catholicity, or just plainly muddleheaded, he always sooner or later innocently and earnestly discovers this undisposed of mass of refuse that everybody else has been throwing out of the back window in order to keep the living room clean; and he runs serious risk of endeavoring to haul it back again in the belief that it is or contains something valuable. Of course he gets more shrugs of the shoulder than enthusiastic visitors. But the reason of the disapproval accorded him is not the entirely good one that the mess he is dragging back in is so dangerously unhealthy that it ought to be buried or burned once for all, but the very bad one that it smells so stale that no one wants to come near it.

In short, the attitude of biologists in general on this problem of acquired heredity is far from satisfyingly vigorous, and when they avoid its further discussion it is not because the problem is settled but precisely because it is unsettled and long unsettled. Scarcely anywhere since Weismann is there any zeal against the

doctrine of acquired heredity as something radically and vitally and destructively wrong. Biology has plenty of fires lit for the unbeliever in some of its principles, as witness the eugenics propaganda; but it scarcely professes a cardinal article of faith on acquired heredity. What brings it about that there exist so much weak condemnation, half tolerance, and hankering?

There are two reasons. The first is the unsolved explanation of the origin of variations. That variations constantly occur no one has denied. But how new variations come to be; how selection operates to preserve them for the future benefit of the race, while they are still so rudimentary as to be functionless and unserviceable; how, unless selection were practically unfailing as regards every individual, new slight variations could be maintained and increased in the face of free interbreeding; these were serious and justified questions that arose soon after the original Darwinian theory was launched. There is no doubt that if use inheritance existed, we should have a much simpler, more natural, and more convincing explanation of evolution, in many cases, than human ingenuity has yet been able to give with the principle of natural selection. Hence it is no wonder that the Lamarckian theory was revived twenty or thirty years after the publication of the "Origin of Species" by several eminent biologists who could not be accused of old-fashioned orthodox hostility to the Darwinian doctrine, but who realized its limitations. It is also of note that these men were in the main not dealers in general speculation, but close students of palaeontology or some other branch of the history of life; and that they were driven to their stand by the difficulty of understanding, in terms of natural selection alone, actual phenomena before them, and not by original preference for any other theory. The conviction of these students is summarized in a clear statement of the situation made long ago by Professor Osborn: "Upon Weismann's principle we can explain Inheritance, but not Evolution, while with Lamarck's principle and Darwin's Selection principle we can explain Evolution, but not, at present, Inheritance. Disprove Lamarck's principle, and we must assume that there is some third factor in Evolution of which we are now ignorant."

This, incidentally, is as true today as it was twenty-five years ago; and it is our continued ignorance of this third factor that still drives some true thinkers into adhesion to the Lamarckian principle as the only available substitute.

More recently the extraordinary discoveries in Mendelian heredity have again made clear that the origin of variations or mutations is an utterly unanswered question, and far from being so simple and self-assumable a thing as it seemed to Darwin and the early Darwinists, that it is a most vital problem of bearing on all evolutionary views. But this is a new conviction; the frequent tolerance toward acquired heredity is older; and even if the Mendelist falls back on use inheritance, it furnishes him, to date, only with a possible key and not a certain one, since the absolute distinction between gamete and zygote which is the kernel and essence of all the new unit heredity seems contradictory of any possible understanding of use inheritance as a process, and leaves it an empty name.

Hence the explanation that might be given, that biology is often indifferent and occasionally even friendly to the unverified and challenged theory of acquired heredity, because the science is unable to discover any other way of accounting for mutations, is mainly a technical explanation, and therefore not a valid one.

For that matter, the average man, educated or uneducated, is firmly convinced of acquired heredity and neither knows what mutations are nor bothers his head about the cause of variability. Now when the leaders of thought and the mass of men agree on a new doctrine, such as perhaps eugenics, it is pretty plain that the mass is following the leaders; but when the doctrine is age-old and therefore necessarily rooted in common ignorance, it is equally plain that the leaders are still traveling with the mass because they have not separated themselves from it; and we can therefore deny them the claim, on the particular point in question, of possessing the wisdom of the elect. At best, they are only falling back upon semi-superstition in default of anything better.

A second reason, then, and not the foregoing explanation, is the general cause of the biological reluctance against a final and definite divorce from the assumption of acquired heredity. It is this.

There is another evolution, distinct from the evolution of organic life, in which use modification is permanent and transmittal of the acquired exists. These two evolutions, although dissimilar in their material and unconnected in process, are analogous enough in their results to have remained undistinguished in the less discriminating days of the past. They are still not separated in the public mind, which always in its bulk is the mind of former periods. And while biologists in general may formally admit the duality of the processes, the controlling majority of them, at least, have not yet made the distinction an active enough part of their mental equipment to put it to consistent use.

This other non-organic process of evolution is that of civilization, of human accomplishment. Speech, knowledge, arts, learning, and all our activities except the bare substratum of physiological abilities, are not inborn. Heredity gives us the slate and the pencil in good working order. Our individual kinds of slates and the sharpness of the pencils are also wholly from heredity. But with the writing on the slate, which is the part we play in civilization, heredity has nothing to do. That comes from social situation, in other words the existing civilization into which we are born.

Now organic evolution, which cannot work except through heredity, is not an accumulative process. The recapitulation of past descent in the early stages of individual existence is so tremendously abbreviated and condensed as to be unimportant even to the individual. Nor does this recapitulation increase and become more consequential with the progress of organic evolution. On the other hand, social evolution is not only essentially but absolutely an accumulative process. We write the Roman alphabet not because we are born with the ability or because our parents were born with it, but because the art is given to us by them as it was given to them by their predecessors, who in turn based their knowledge upon the accomplishment of nations that wrote consonantly or syllabically, while back of that presumably lies word writing, then idea writing, then picture writing, then plain pictures.

Accumulation is not always the most conspicuous trait of the process of civilizational evolution; because the accumulation is

often so slow as to be imperceptible except to the historian, or sometimes so remote as to have been forgotten. Such is the case with human speech. But even in such instances there are other criteria that mark the products of this evolution off from those due to organic evolution. Our speech is not instinctive like the bark of the dog or the song of the birds, but learned. It comes to us from the outside, that of animals from within. We acquire our so-called mother tongue as readily and as perfectly from a foster mother as from the zygote that produced one of the two gametes that made us; the non-human animal derives and can derive its language only from the zygote of which it is a bud or from the two zygotes of which its originating gametes are sprung. All that our actual parents give us is the faculty of speaking. The words, the idioms, the grammatical processes, the associated ideas, we derive from them not as parents but as members of a social group of which they happen to form a usual but perfectly accidental part.

As this social group develops anything new in its civilization or acquires any modification of its social activities, we and our successors acquire it too. Use inheritance is therefore strictly true of social evolution. It is precisely the method by which this evolution takes place.

It is also a fact that organic and social evolution evince a number of surprising analogies. The growth of life, both in the whole and in the individual, is remarkably similar in superficial appearance to the growth of civilization. But it is obvious that the processes by which these two growths take place are fundamentally different, unconnected, and even in a sense opposite.

Now every biologist and every sociologist knows this distinction. But even great biologists and great sociologists have forgotten it. Lesser ones forget it daily even now. And the unprofessional public, except in cases of rare native sense or profound mother-wit, does not of course even know that there is a difference. As little did former ages realize that the process mattered. To them, too largely, whatever was transmitted from the past was inherited. The very word which we still use to express the process of organic transmission, "heredity," refers originally to social transmission.

"Haeres" is an heir—a nephew or a father as the case may be, as readily as a son. Biologically we do not inherit from uncles or sons; and the use of the term heredity to denote organic inheritance could have taken place only in a time when the difference between this process and that of social inheritance was veiled by the outward similarity of their effects, and when its significance was not yet perceived and made use of.

Everyone knows that a million dollars however lawfully inherited are not a unit character. Even a layman will admit that we do not inherit a coat of tan from a grandfather. But on the other hand, when the conditions are sufficiently stretched to be tenuous and vague, when the elements of knowledge become vanishingly small in the haze of unavowed ignorance, even scientists revert to naïve methods of thought, and cheerfully assume or gravely argue that a fair race will turn black from tropical exposure of continued generations, and that the acquisition of greater wealth or learning or skill by one group is evidence of a superior faculty for such acquisition inborn in that group through organic heredity. In the whole matter of difference between nations, castes, or social groups, biologists as a class are still amazingly primitive mentally. Instead of inquiring whether there is any relation whatsoever between these social groups and the organic species and races with which they themselves are wont to deal, they take identity for granted and then proceed to explain phenomena of social evolution by processes of organic development.

Historians have not been quite so crude: but they deserve no credit for the fact. The reason is not that they have discriminated more clearly, but that history is older than biology. Man's interest is first in himself, only secondly in nature. Hence in ancient times and in half-civilized forms of society it is rather organic phenomena that are explained by social processes when they are explained at all; and the historians of the past, perhaps, have lapsed into fewer errors than biologists, not because they understood man better but because they were not at all interested in the animal.

The modern historian is sometimes still as innocent as his predecessors, though fashion requires him to appear more learned.

But the sociologist of today has an avowed goal, and must make himself a program; and only too frequently a lack of imagination leaves him no resource but to pick up the tools of the biologist and set to work blindly. It is true that one profession contains no more ability and no more incompetence than another. But as times progress, the chances of achievement, or the opportunities for error, alter.

Biologists have such a fatal opportunity now; and many of them have stepped into the trap. History, except in what it professes, is very much where it stood two thousand years ago. But biology has been born in the last century or two. It has forged its weapons, taught itself their use, conquered a territory, and stands forth a young giant of prowess. What wonder that it has proceeded by the divine right of power to annex the antiquated realm of history that lay adjacent, and to impose its rule and laws without inquiring whether they were fit? The greater fault is not with the biologists who have explained historical phenomena by organic processes, but with the sociologists who have accepted and welcomed these alien explanations.

The degree to which biologists and those infected with biological methods of thought deceive themselves into believing that they are resolving social phenomena into organic factors is truly astounding. In the matter of the facultative equivalence or identity of the human races, as already mentioned, the average biologist assumes his answer, instead of defining his problem, as blithely as an ignorant person. Some write with confident optimism on the biological status *and* social worth of hybrid races, and no voice is raised. But let a historian, or theologian, or any one else discuss in one breath the infallibility and the specific gravity of the Pope, and he will be set down as literally insane.

The entire doctrine of eugenics is an endeavor to attain moral ends by biological means. Moral of course is social; and yet the open protests have come—strange partnership!—from the orthodoxly religious and the professedly skeptical, but rarely from the enlightened camp of science. Not the educated thinker but the uninformed man on the street raises the valid objection—and it is

not only valid but perhaps the only one that counts,—that eugenics is right enough for hogs but not for men. We have, indeed, come almost to the point where the learned try to forget, and only ignoramuses remember, that while men are animals, animals are not men, and that however much a human being may have of the nature of the pig, he nevertheless has one thing that no pig ever had, namely the faculty for civilization and hence for morality, to use an ancient term.

Darwin a number of times cites traits or habits of savages as if they might be indicative of transitions between civilized man and the other higher animals. Such confusion of perception as he may be guilty of, is however not seriously material. Darwin was an explainer of the organic, and avowedly not a historian of the social. If in buttressing his views he was occasionally deceived by an analogy and adduced as argument an instance that neither rests upon heredity nor has anything to do with the evolution of life, such slips do not weaken his case nor detract from his fame, especially as his utterances on such points are regularly tempered by a wise restraint of statement.

It is another and more vital failure, when we of today, biologists, sociologists, anthropologists, and sometimes historians, with fifty years of advantage over Darwin, we to whom organic evolution is no longer an ideal doctrine to be justified to the world but a foundation from which we are building, are guilty, often in an exaggerated degree, of the inability to discriminate the two forces involved. There is nothing that reveals more illuminatingly the intrinsic greatness of Darwin's mind than a comparison between his infrequent inclinations to lapse in using a social fact to drive home an argument for organic evolution—lapses in which moreover he almost always leaves the door open to a truer judgment,—and between the thin, meaningless edifices of empty theory that it is the fashion today to rear in mistaken imitation of the master and under the misleading name of "explanations" of "social evolution."

Such attempts as these may be pardoned when they come from orthodox Socialists whose aim is not truth but political propaganda. But it is difficult to accept with tolerance the numerous professedly

scientific books that disguisedly or openly rest upon the fallacy that the social is organic. Restraint of expression against this flood is difficult, particularly since from the very beginning there have been voices of warning, notably from the codiscoverer of the doctrine of natural selection.

Wallace in his later years lost much of his credit in scientific quarters by his undiluted espousal of spiritualism, phrenology, and other dishonored causes. It may also be doubtful whether his assertion that the organic factor of selection does not apply to man as it does to animals, was due in greater measure to an actually keener perception of the difference of the social from the organic than Darwin possessed, or merely to greater inclination toward orthodox theological separation of the human soul from the living body. But whatever the impelling motive, he made the distinction; his name carried weight; and subsequent heedlessness is therefore without justification.

The profoundly imaginative nature of Galton was less preserved toward balance on this point than the temperament of his cousin Darwin. In "Hereditary Genius" Galton shows that as between individuals mental faculties are inherited in the same ratio and degree, and therefore presumably in the same manner, as physical traits, which is reasonable as well as convincing. But it is an entirely unconvincing inference when he then proceeds to explain the diversity between the attainments of social groups such as ancient Athenians, modern Englishmen, Africans, and Australian natives, as due to differences between the average inherited faculties of the bodies of men carrying the civilizations of these social groups. He is still less convincing when he expresses these differences quantitatively—only every twelfth Britisher, four hundredth negro, or four thousandth Blackfellow attaining to the inborn mentality of the every day normal Athenian of the time of Pericles. It is inference of the same sort that leads him to the conclusion that on the scale upon which the Athenian surpasses the Australian by five intervals, the dog, in memory and power of reason, stands below the human race by eleven intervals, and apparently below the Australian by only eight. Of the same type is the reasoning which

ascribes the alleged poverty of Mediaeval civilization—entirely overlooking its great accomplishments, by the way,—to the distinctively selecting influence of the celibacy practised by many of its best minds. Such views are utterly untenable except on the preconception that social forces as such do not exist and that social phenomena are all ultimately, and in general directly, resolvable into organic factors. What other psychology than this can we attribute to Galton when he makes the astounding statement that in his belief the rapid rise of new colonies and the decay of old civilizations is mainly due to their respective social agencies, which in the one case promote, and in the other retard, the marriages of the most suitable breeds? In other words, social agencies may be nominally admitted, but they affect society through their organic operations!

With Galton descending into these crudities, it is no wonder that many lesser men have sinned as deeply, though their more pallid intellects have vaguened the fault.

Weismann's hostility to the belief in heredity of the acquired might be expected to have led him intuitively to an unusual power of discrimination of the organic from the social. This is a fact. His essay on the Musical Sense, for instance, is a startlingly keen and sound analysis of the difference between heredity and tradition, between faculty and achievement. He realizes fully that a Mozart could not have done Mozart's work in another social environment, such as that of the Australian Blackfellows, and his realization is supported by authentic reasons. Up to this point no more rigid adherence to true sociological method could be asked of a pure historian. But at the very end of the essay, when one expects the final logical step and the pronouncement that the Australians undoubtedly may have had their Mozarts, in short that life and its processes are one thing and civilization and its agencies another, the force of association asserts itself, the professional evolutionary biologist reappears, and the argument is lamely hastened to the inconsequent conclusion that faculties are probably different after all. The work remains a brilliant miss, splendid in its display of the rigorous clearness which was Weismann's basic strength; but it is a miss nevertheless.

It must once more be asserted unconditionally that it is not to be inferred from these examples that biologists are any worse reasoners than students in other departments of knowledge. Chemists do not feel impelled to expound the rise of genius in chemical terms or to explain the variety of moral codes by valences and atomic weights. They therefore leave civilization alone, or if they pronounce judgments in its field, do so avowedly as laymen. But biologists view the province of the social from their very doorsteps. They are dazzled by the remarkable parallelism of the growth of the social and the organic; and they have therefore normally been driven by ambitious enterprise, and often by a sense of duty as well, to invade the fertile and universally interesting realm of human history.

It would then appear that belief in acquired heredity is merely a result of the failure to distinguish between social and organic processes, and a remnant of the ruder vision of former times when heir meant both a descendant by reproduction and the inheritor of possessions. If heredity by acquisition is still taken seriously by many earnest students, it is not because the evidence compels them, but because they make evidence in behalf of what they want to believe, just as all men in all matters tend normally to believe what is most satisfying and then to find corroborative arguments. The theory of acquired heredity is at the present time almost as belated a survival as the popular doctrine of prenatal influence which maintains itself with similar vigor in the face of every scrap of unbiased evidence. Both are processes of thinking which if found in the minds of uncivilized people would be described as belief in sympathetic magic. When the peasant woman wraps a round hard stone in linen and then goes home and bakes pancakes in order that her cabbages may be firm, white, sound, and large-leaved, the resemblances of fact which she has in her attention are true enough. She only fails to inquire if there is any possibility of the involved processes of causality being also identical. When a child is born with a flame-shaped red birth mark a few months after the mother has witnessed a conflagration, the average European is correct enough in his observation of a similarity of the

phénomena. Only he fails to inquire whether there is the least chance that there may be a mechanism through which one event can become the cause of the other. When the reasoner infected with biological ideas or the habit of over-hasty social generalizing sees in the growth and decay of a nation nothing but the multiplied life-cycle of an organism; or when he notes the parallelism between men accumulating the inventions of their antecessors, and species of animals in new circumstances adding new organs or faculties to their previous traits; the analogies his mind dwells on are undeniable. But when he asserts the same cause for both sets of phenomena, his explanation is uncritical and not far from supernatural. This is as true when he is a sociologist and accounts for phases of civilization by innate racial heredity or by the selection of imported malaria, as when he is a biologist and resolves organic evolution even partly into a process which is merely a made-over adaptation of the process of racial transmission.

When this point is once grasped, and the distinction between the forces of life and the forces of civilization is courageously adhered to, the eyes see a new world. There is no longer any problem of acquired heredity nor any possibility of a problem. To refute it becomes as wasteful, and as encouraging of superstition, as to argue scientifically about the sacredness of seven or the harmony of the spheres. Sensible and reverent people today bury their dead; they do not discuss whether the embalmed mummy may not after all maintain some kind of an existence. Least of all do they want it around the house, or even stowed away in the attic.

The great mass of biologists are absolutely right in refusing to consider any further the question of acquired heredity. It is only the motive for their refusal that can be challenged. Too often it is not that they have seen light, but that their spirit is weary.

The old tiresome problem then is insoluble because it is no problem. It is justified to refuse to consider it farther, and proper to disregard all alleged and tempting evidence in its favor, as all evidence springing from motive is discredited in advance.

Biology and history can join hands in alliance across the gulf that separates them. The students of life can even derive help

and profit from the students of human achievement. They can learn from them what acquirement is and how it is transmitted. Once it is identified, they will expel this alien incubus upon their work. They will limit their authority to what they can naturally subdue and govern. They will rid their science, which in every aspect revolves either closely or remotely about heredity, of an essentially non-hereditary and even anti-hereditary factor, and will then be free to explain the organic basis of history by purely organic causes, leaving the explanation of history itself, so far as one may be possible, to the historical methods of historians. If biologists neglect to take this stand, scientists of the social will in the end revolt violently against their authority and attain their own separateness by force. Under a wise and natural segregation, not so much of extent as of method consistently upheld within the demarked scope, each study will work out its independent destiny justly and intelligently, until the future gives them new contacts and new bonds.

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HOLDING BACK IN CRISIS CEREMONIALISM

By ELSIE CLEWS PARSONS

BY crisis ceremonial I mean ceremonial to signalize or allow of the passing from one stage of life to another, what Van Gennep calls "*rites de passage*," what the Greeks called *telêlêz*, the putting off of the old, the putting on of the new—adolescence or initiation rites, marriage rites, funeral rites or mourning.

In the interpretation of crisis ceremonialism I am suggesting, there are two main features, related features, for both refer to what I take to be the characteristic attitude of primitive culture towards change, the attitude that change can be ignored—up to a certain point—and controlled—within a certain degree. Through ceremonialism change is ignored, *i. e.*, it is not met as it occurs and it is controlled, *i. e.*, it is made dependent on the ceremony, established and disposed of ceremonially.

The desire to put off meeting change may be considered, I suppose, as an expression of the pull of habit. As for the desire to have a say about it when it is inevitable, and to make out that it is under group control the Freudians will tell us no doubt that here we have a patent manifestation of the group's will to power.

At any rate the particular feature of crisis ceremonial I wish to discuss, its features of reluctance, of holding back, may be taken as an outcome of the pull of habit, actual or conventionalized, an outcome too, which is tolerated or encouraged because it increases through resistance natural or simulated the group's sense of power.

What display of resistance or of reluctance is there at initiation? I will give a few instances:

In Central Australia preparations for the initiation are made unknown to the lad to be initiated.¹ Then frightened when hands are laid upon him, he struggles to get free. Similarly in Queensland

¹ Spencer, B. and Gillen, F. J. *The Native Tribes of Central Australia*, p. 219. London and New York, 1899.

a girl is decoyed away from camp, ambushed and then operated upon despite all her shrieks and entreaties.¹ Indeed in every Blackfellow tribe the initiate or adolescent, boy or girl, is regularly taken by surprise and subjected to force. In the New Britain ceremonial, a coil of shell-money is thrown over the initiate's head, to placate him it is said. If he succeeds in breaking away from his captors before the coil is thrown, he is allowed to escape. The next time he is caught and breaks away it is etiquette for him to try to kill his pursuers.² In this connection there is a reference to the attitude of the Banks islands initiate perhaps worth citing. "One day," Dr. Rivers puts it, "one day John would say to Mark [his nephew], 'I will now make you *sukwe*'. . . . This would make Mark sad, for he would know that he had not enough money for the purpose and he might even refuse to accept his uncle's proposal."³ Is it not possible, I suggest, that Mark's sadness and hesitation have other causes? We may note too that in the native speech to the neophyte Rivers transcribes, the neophyte is regarded as having been *sulky*.⁴

On the part of an initiate's kindred, particularly his kinswomen,⁵ resistance and reluctance are also displayed. Narrinyeri initiates are seized upon at night by the men. The women resist or pretend to resist, pulling back the captives and throwing firebrands at the captors.⁶ In the Port Lincoln district after the initiate is seized the women are forced out of their shelters to shout and lament as if in deep grief. Their fears, it is said, are ceremonial.⁷ In the

¹ Roth, W. E. *Ethnological Studies among the North-West Central Queensland Aborigines*, p. 174. Brisbane and London, 1897.

² Danks, B., in *Journal Anthropological Institute*, XVIII (1888-9), p. 286-7.

³ Rivers, W. H. R. *The History of Melanesian Society*, I, 64. Cambridge, 1914.

⁴ *Ib.*, I, 102.

⁵ Part of the feelings of the women is no doubt grief over the more or less permanent separation of the boys. The lifelong separation of the sexes is begun at initiation and no doubt ceremonially accentuated.

By one engaged in proving that women are more sentimental than men, more reluctant to face the facts of change, their attitude at initiations and in other crisis ceremonials merits attention.

⁶ Smyth, R. Brough. *The Aborigines of Victoria*, I, 166. Melbourne and London, 1878.

⁷ *Ib.*, I, 67.

Mita-Koodi tribe throughout the first night of the initiation the women are supposed to wail.¹ In the Euahlayi tribe the old men bring in presents of food to the initiates' kinswomen to comfort them, telling them that spirit women are the givers.² A Yaroinga initiate is decorated with white and red feather down and white feathers for his head. When his father and his mother's brothers first gaze upon him in this get-up they begin to weep and the better to express their grief they besmear themselves with grease and ashes.³ The morning after the Andamanese initiate breaks his turtle fast his kinswomen come and weep over him.⁴ In the Western islands of Torres straits when the boys' families see them for the first time after their month's absence all but the boys themselves set up a howl, fathers included.⁵ In the Bismarck archipelago kinswomen lament and scream on the occasion of initiations.⁶ When a Banks island initiate leaves his kinswomen they cry as if he were leaving them for a long time.⁷ A Tikopia boy is incised when he is about twelve years old. During the operation his relatives weep, the men cutting themselves on the forehead, the women tearing their cheeks with their nails.⁸

The initiation of offspring marks among several peoples the entrance of parents into another age-class. Ceremonial expressions of reluctance to be promoted among the elders appear to be scant, perhaps because the privileges of seniority in early culture are so great. To our formulas for the occasion—"I hear your boy is entering college. What an old fellow you must feel," or, "My

¹ Roth, p. 173.

² Parker, K. L. *The Euahlayi Tribe*, p. 59. London, 1905.

³ Roth, p. 172.

⁴ Man, E. H., in *Journal Anthropological Institute*, XII (1882-3), 131.

⁵ *Reports Cambridge Anthropological Expedition to Torres Straits*, V, 211. Cambridge, 1904.

⁶ Parkinson, R. *Dreissig Jahre in der Südsee*, pp. 582-585. Stuttgart, 1907.

⁷ Rivers, I, 101. Confined in the *salagoro* in old days it not infrequently happened that they never did see him again. Dr. Rivers believes, however, that the wailing is part of the conception of initiation as a ceremonial death. (*Ib.*, I, 127). Belief thus explicit may be held, but it is not necessary, to explain the mourning. The wailing is quite adequately accounted for by the diffuse feeling that the boy is setting forth in life.

⁸ Rivers, *Ib.*, I, 312.

daughter is coming out, it makes me feel like an old woman," to such formulas of regret I find but one analogue. A Masai may not be circumcised and qualified for the warrior class until his father has observed a ceremonial called "the passing of the fence." After four days of isolation, as the father is passing the fence, he is addressed by an elder: "Go, become an old man." He replies: "Ho, I shall not!" Four times the order is given and four times objected to. The fifth time, the father answers: "Ho! I have gone then."¹

In marriage ceremonial the observation of resistance and reluctance has been closer and fuller. Much of it has been compiled too—to illustrate or prove the existence of marriage by capture and its survival in the so-called rape symbols. It is not good proof for the most part for that historic speculation just because it does illustrate the theory of marriage as crisis ceremonialism. The resistance or holding back is generally an individual display of the bride, often against her own people, and when her kindred do resist or hang back it is the women rather than the men of the family who are most assertive. Other circumstances also suggest that the "capture" is merely of the girl herself, and not of the girl away from her people. The capture may be connived at by her family or even planned for. After it she may be taken back to her home for the subsequent part of the ceremonial, or even to live there for a period. Again in widow marriage the "rape symbol" may be dropped out—just as one might expect in the case of a rite to express reluctance against a novel relationship, but not to be expected if the loss of a woman to her family were the idea in mind.

Bridegroom as well as bride may show reluctance and in ways too that are a droll commentary on the much discussed theory of the "rape symbol."

Among the Roro-speaking tribes of New Guinea when the bridegroom sees the bridal procession coming, he hides in the *marea* or clubhouse. The village youths drag him forth, and disregarding his protests, having painted and decorated him, bring him to his father's house. Here he is made to sit down near the bride.

¹ Hollis, A. C. *The Masai*, p. 295. Oxford, 1905.

Neither pays any attention to the other.¹ From his place among the bachelors the Andamanese bridegroom has also to be dragged away. When the chief or elder approaches him he at once assumes a modest demeanor and simulates the greatest reluctance to join his *fiancée*.² In the Eastern islands of Torres straits the bridegroom pretends to be greatly ashamed, hiding his face.³ Among the Chukmas of India, as elsewhere, feeding each other is one of the rites expected of the bridal pair. A Chukma bridegroom as well as bride is very bashful over it, and to the hilarity of all present the best man raises the bridegroom's hand to the bride's mouth.⁴ Among some of the Garo tribes the girls propose and it is customary for the man who receives a proposal to run away and hide. His friends search for him and bring him back to the village by force. He escapes to be captured a second time, but if he runs away for the third time it is assumed that he is in earnest and he is let go free.⁵ For five days a New Britain bride stays alone in the bridegroom's house, while he hides away in the forest or in some place in the high grass known only to the men.⁶ Among the Abschasses of the Caucasus the bridegroom runs away and hides on his wedding night, to be brought back by force the following day.⁷

The analogous behavior of the bride is far too well known to need particularization. But to one of the methods in use to overcome her reluctance I would draw attention, the method of bribery. Almost as misleading to the ethnographer as the tag of "rape symbol" has been the tag of "bride-price." Any present on the occasion of a marriage he puts down as part of the purchase sum signaling a marriage by purchase. Whether the presents are

¹ Seligmann, C. G. *The Melanesians of British New Guinea*, p. 269. Cambridge, 1910.

² Man, p. 137.

³ *Report Cambridge Anthropological Expedition to Torres Straits*, VI, 113. Cambridge, 1908.

⁴ Lewin, T. H. *Wild Races of South Eastern India*, p. 178. London, 1870.

⁵ Playfair, A. *The Garos*, p. 67. London, 1909.

⁶ Danks, pp. 286-7. Cp. Parkinson, pp. 65-6. After two or three days the bridegroom begins to pay a daily visit to the bride, she giving him a meal. Then he may go with her to her field work. After some weeks he builds a house and the first night the couple spends in it the marriage is considered to be finally contracted. See p. 51.

⁷ Seidlitz, N. V. "Die Abchassen." *Globus*, LXVI (1894), 40.

made before the wedding, during its celebration or afterwards, whatever their nature, from a lock of hair or a bunch of flowers to a pig or a diamond tiara, whether they are made by the bridegroom or his family or friends or by the bride or her family or friends it makes no difference, they are all likely to be accounted for as a bride-price or derivatives at least of a bride-price. In this welter of wedding-presents may be distinguished, I think, presents that appear to be, far more than a compensation, a bribe, a short-cut to overcome the reluctances, sometimes of the bride, sometimes of kindred, to enter into or envisage the new relationship or the new stage of life.

Among the Zambales Negritos during the *leput* or ceremonial home-coming of the bridegroom with his bride, the lady squats down on the ground from time to time and refuses to budge until she receives a present.¹ A bride's conduct in Uganda is similarly contrary. Carried by the bridegroom's retainers she is set down at his threshold. There she balks until the bridegroom comes out to give her cowries. Indoors she declines to sit down and make herself at home until she gets another present of cowries. Later still another present has to be forthcoming to induce her to eat.² In Fiji the presents the weeping³ bride receives from the bridegroom's party are actually called "drying-up-of-the-tears," *vaka-mamaca*.⁴ In the account George Sand⁵ gives us of the wedding practices of Berry, a district in the heart of France, the French bride is quite as unmistakably bribed as the Fijian. Barred out, the bridegroom's party sing to her:

"Ouvrez la porte, ouvrez,
Marie, ma mignonne,
J'ous de beaux cadeaux a vous présenter
Hélas! ma mie, laissez-nous entrer."

And then the song goes on to specify all the charming things they

¹ Reed, W. A. *Negritos of Zambales*, pp. 59-60. Manila, 1904.

² Roscoe, J., in *Journal Anthropological Institute*, XXXII (1902), 37.

³ She weeps although her marriage has been the outcome of a mutual attachment, not, as in other types of Fijian marriages, of betrothal in infancy, or of purely parental determination.

⁴ Williams, T. *Fiji and the Fijians*, I, 169. London, 1858.

⁵ *La Mare au Diable*.

have for¹ her—ribbons and lace, a fine apron, a hundred pins, a cross of gold.² Among the Bashkirs although a girl may have been visited by her betrothed most intimately for a long time when on the final payment on the bride-price he takes her home, she refuses to embrace him until he gives her a piece of money.³ Sicily, said its poets, was given by Zeus to Persephone on her marriage to Hades.⁴ It was her *anacalypteria*, the presents bestowed upon a Greek bride by her bridegroom and his friends when she first unveiled to his eyes. Were not the *anacalypteria* once in the nature of a bribe, even if all Greek brides were not as reluctant as the fair Proserpina? In modern times among the Arabs of Cairo an unveiling present is also made to a bride (and to her attendants). It is called "the price for the uncovering of the face."⁵ Among the Beni Amer the postnuptial present, *efin*, has to be repeated after the first child is born as an inducement to congress, the parts of the young mother having been closed again, African fashion, as in maidenhood.⁶ . . . Unmistakable bribes, all these, but even more dubious instances, even the *morgen gab* for example, and its many variations I prefer to think of as originally a prospective bribe rather than as compensation money, its orthodox explanation.

When it is not the bride but her people who receive the presents the orthodox explanation or term seems more valid. In their case, between presents as bribes and presents as compensation, the incipient form at least of a bride-price, it may be at times hard to distinguish. And yet if each case is considered in its own setting the distinction in many instances appears justified.—When the Zambales bridegroom and his parents go to the home of the *fiancée*

¹ None of them appears to materialize; but in the church the bridegroom gives the bride *le treizain*, thirteen pieces of silver.

² It is this account which is cited by McLennan as evidence for the survival of a rape symbol in France. "Primitive Marriage," App. in *Studies in Ancient History*. But the bride's refrain, sung for her by the matrons, suggests an explanation other than that of the rape symbol for all that follows.

"Mon père est en chagrin, ma mère en grand' tristesse"—a father angry and a mother sorrowing over the disturbance of their family life.

³ Van Gennep, A. *Les Rites de Passage*, p. 173. Paris, 1909.

⁴ Diodorus Siculus, Bk. V, Ch. 1.

⁵ Burckhardt, J. L. *Arabic Proverbs*, p. 139. London, 1875.

⁶ Munzinger, W. *Ostafrikanische Studien*, p. 324. Basle, 1883.

to ask for her they are usually told she is "not at home," a way of saying that without a *douceur* she will not be produced.¹ After the *vakamamaca* there follows in the Fijian ceremonial the *vakatrakata* or "warming," food from the bridegroom's party to the bride's.² It were tiresome to enumerate all the cases in which such presents occur, presents of food, etc., and occur quite apart from the specific bride-price. I give but two, their bribery character unmistakable. On the morning after a wedding among the Roro-speaking tribes, the bride's father takes up his stand outside the house of the bridegroom's father and, although he has already been paid-up, proceeds to indulge in abuse. He has to be pacified by the present of a dog. Three days later the bride's mother visits her to weep and groan until a pig is killed for her. Then her bewailment gives place to praise of the generosity of her son-in-law and his family.³ Among the Khyongtha as the bridegroom's party approaches the bride's village her kinswomen bar the entrance with a bamboo. Across this barrier the bridegroom has to pass around a loving-cup of spirits. He may be barred out in this way five or six times before he is finally allowed in.⁴ In the more developed culture of India, among high caste Hindus, it is when the bridegroom wishes to leave the bridal apartments that the kinswomen of the bride get in his way. Not until he hands over to them the *sarjyátoláni*, a sum of from thirty to fifty rupees, will they, particularly his sisters-in-law, loosen their hold on the skirt of his silken garment.⁵

It is, we note, the kinswomen not the kinsmen who are the obstructionists. One of the difficulties in the way of the theory of the rape symbolists, a difficulty they ignore, is the predominant activity of the kinswomen.⁶ Why should they be more to the fore,

¹ Reed, pp. 58-9.

² Williams, I, 169.

³ Seligmann, pp. 269-70.

⁴ Levin, p. 127.

⁵ Bose, Shib Chunder. *The Hindoos as They Are*, p. 68. Calcutta and London, 1883.

⁶ Or of the women among the fellow villagers. Their resistance, according to Crawley, is an expression of sex solidarity. The rape symbol indicates an abduction from the sex, not merely from kindred. (*The Mystic Rose*, p. 370). But how on this hypothesis explain the resistance of the bridegroom's people? How explain the fact, for example, that in the Iglauer peninsula in Mähren the village women, having tied

as they quite commonly are, than the kinsmen? It is a difficulty, the act of ceremonially obstructing, if it is thought of not as a rape symbol but as an expression merely of reluctance, does not present. Kinswomen object to a change in the family even more than kinsmen, and women I can but surmise are more opposed to meeting change in general than men. The row they make on the occasion of a wedding is a kind of ceremonial bluster or ceremonial nagging—when it is not ceremonial grief.

And it may come from the kinswomen of the bridegroom as well. In Northern India his sister or some other near kinswoman refuses to let the home-coming bridal couple enter the house until she receives *largess*.¹ This practice, Crooke suggests, would not be unnatural in a strictly exogamous community where the bride is felt to be an outsider. But the bride who is taken into her husband's family is always somewhat of an outsider and to that family a source of embarrassment.²

In his new rôle the son of the family may also be disconcerting and may be called upon to save the situation with presents. On his return home from his wedding the Abchasse bridegroom may not show himself to his parents or senior relatives until he appears formally at the feast given him by the father. The feast is called *aphchascharche*, "banisher of shame." At it he makes presents to all his senior relatives.³

Another ceremonial display of reluctance at marriage is the separation of bride and groom until the close of the ceremonial, sometimes very protracted, and even for some time afterwards. The avoidance practised in the so-called Tobias nights is a taboo not limited to the early Christian Church. In Australia the Mukjarawaint bride sleeps the first night of her marriage on the ground outside her bridegroom's camp.⁴ The Euahlayi bride is expected to

a string across the road of the bride who is arriving from a strange village, have to be bought off with a large cake, a bottle of brandy, and a gulden? (Sammter, E. *Geburt, Hochzeit und Tod*, p. 163. Leipzig and Berlin, 1911.)

¹ Crooke, W. "The Lifting of the Bride." *Folk-Lore*, XIII (1902), 232.

² How they are wont to cope with it is familiar to the student of *avoidance* customs.

³ Seidlitz, p. 41.

⁴ Howitt, A. W. *The Native Tribes of South-East Australia*, p. 245. London and New York, 1904.

sleep with a fire between herself and her bridegroom.¹ In Queensland, Frazer island, bride and bridegroom live alone for two months in huts about six yards apart.² The Roro-speaking bridegroom is just as "shy" after his wedding as before. On his wedding night he goes back to his clubhouse leaving his bride to sleep alone in the house of his father. He is brought back to her the following day, but he does not spend the night. The third day the couple is supposed to be "reconciled," but the bridegroom continues to sleep at the clubhouse for several weeks.³ Among the Andamanese "it often happens that a young couple will pass several days after their nuptials without exchanging a single word, and to such an extent do they carry their bashfulness that they even avoid looking at each other."⁴ That formality may enter into this attitude one may at least surmise. The Tikopia bridal pair sleep together for four nights without consummation.⁵ The Kikúyu bride sleeps four nights in the hut the bridegroom has made ready, he staying in his father's house.⁶ In Uganda a kinswoman goes with the bride to the groom's dwelling and sleeps there for two nights with the bride.⁷ Among the Hupa of Northern California congress is postponed for five nights, that the couple may get used to each other, the old people say.⁸ Until a Khyongtha bridegroom has eaten with the bride seven days, seven times a day, he does not consummate the marriage.⁹ . . . There are other instances I might cite of this deferment rite, but instead of what would become

¹ Parker, p. 58.

² Smyth, I, 84 ft.

³ Seligmann, pp. 269-70.

⁴ Man, X, p. 138.

⁵ Rivers, I, 309-10.

⁶ Routledge, W. S. & K. *With a Prehistoric People*, p. 130. London, 1910.

⁷ Roscoe, J. *The Baganda*, p. 90. London, 1911.

⁸ Goddard, P. E. Personal communication. M. C. Stevenson reports a similar custom among the Zuñi. "The Zuñi Indians," p. 304. (23rd (1901-2) *Ann. Rep. Bur. Amer. Ethn.*) The Zuñi of my acquaintance assert, however, that such is not and never was their practice. The couple sleep together from the beginning, but for the first night or two or perhaps longer the bridegroom comes in late, after the old people are asleep, and he leaves early, before they awake. And for these first days he continues taking his meals with his own family. His shyness is referred to as "staying still."

⁹ Lewin, p.130.

a tiresome enumeration let me conclude by pointing out that even when deferment is not an explicit ceremonial it may be implicitly or indirectly required by the assumption that offspring are not to be born within a year or two of the marriage. Among the Massim no trace of ceremonial deferment has been observed and yet a man at Mukana, a bridegroom of at least two months, volunteered to Dr. Seligmann the information that he had not yet had connection with his wife for if a child were born within a year of marriage people would sneer, saying, "What sort of children are these?"¹ Among the Roro-speaking tribes where deferment, we remember, is customary a woman in former times did not expect to bear a child until her garden was bearing well, *i. e.*, until she had been married one to two years.² In the New Britain islands children were not born for a period from two to four years after marriage. "Women did not like to speedily become mothers."³

Of the conventionalized expression of reluctance to meet change that occurs in marriage and initiation ceremonial I have given illustrations, some of the facts having been otherwise interpreted; but I need not particularize with illustrations about the unwillingness to meet the change made by death. I have only to refer to various well-known beliefs or practices—the belief that the spirit of the deceased lingers for a period—hours or days or longer—about his home; the set appeals to the dead to return or—to be off; the provision for the wants of the lingering ghost, for both his material and his emotional wants; the preservation of his remains or relics or of his memory or influence; early theories of the life after death, the continuation theory, the theory of reincarnation.

All these ideas or practices appear to express resistances against the Great Change, as the ritualist's descendant, the sentimentalist, calls it; but the ceremonial of the final exorcism is of them all the most pertinent to this discussion, the most analogous with the rites of initiation and marriage. It implies of course a decided reluctance on the part of the ghost to be gone, to start in on his new

¹ Seligmann, p. 745.

² *Ib.*, pp. 269–70.

³ Danks, p. 287.

career, and it asserts that through the rite he can be made to do so—the group controls change in the life of the dead as well as the living. At the *ita* feast of the Koita, six months after the decease, the time when the widow is relieved of her mourning, rubbing off her black paint and putting on a clean petticoat, the brother of the deceased makes a speech to the replete villagers: “We have been eating for and in remembrance of the dead,” he says, “now let us worry no more about him since he has ceased from among us.” Just as he was once made a man, and then a husband, the deceased is now in the terms of the native “finished.”

That it is a relief when the funeral is over is sometimes said among us, but our sense of *finishing* the dead isn't quite as definite as the Melanesian. Nor are our attempts to make a man of a boy or a good husband of a man. Ceremonialism in fact is passing out of our life—perhaps because the desires back of it are dwindling, the desire to shirk change and the desire to control others directly instead of indirectly—at any rate crisis ceremonialism is passing out of modern culture. It will leave fragments of itself behind, however, and the state of mind that prompts it will persist in individuals and will so color points of view and so shape turns of speech as to supply an abundance of enigmas to the rationalists of the future.

NEW YORK CITY

THE QUESTION OF THE ZODIAC IN AMERICA

By HERBERT J. SPINDEN

THE zodiac has long held a place in Old World astronomy but it is doubtful whether any conception remotely resembling it ever existed among American Indians. An opinion to the contrary by Humboldt,¹ one of the first scientists to appreciate the remarkable advances in astronomy made by the ancient Mexicans, obtained wide credence and is often quoted.² While none of the early authorities of the first order in either Mexico or Peru makes a definite statement that the zodiac or anything like it was known to the Indians before the arrival of the Spaniards there are not lacking secondary authorities³ who give some support to this idea. A number of modern champions of the zodiac in America have often expressed their views in scientific journals and it seems proper to state the case of the opposition lest they win by default. In the course of argument these writers have repeatedly assumed identity in meaning (and therefore an unavoidable historical connection) between astronomical and hieratic symbols in Mexico and Central America and zodiacal symbols in the Old World, but have failed conspicuously to meet the broader arguments in force against such assumptions.

In this paper the discussion will proceed as follows. First, will be presented a brief explanation of the Old World zodiac and a summary of the general arguments against the assumption that this concept was transferred to the New World before the time of Columbus. This summary is not designed to settle the question upon *a priori* grounds but simply to record the tremendous weight of evidence against the aforesaid assumption of transference. Second, the particular proofs and arguments made by the champions

¹ 1810, p. 149, et seq.

² Clerke, 1911.

³ For instance, Granados.

of the Old World zodiac in America will be examined upon their own merits, in the light of scientific research in Mexico, Central America, Peru, etc. Third, the possibility of an independent invention in the New World of a concept analogous to the classical zodiac will be discussed. This last phase of the subject will take us out of destructive criticism into a field that is practically undeveloped.

The formal zodiac is a band round the celestial sphere, about 18° in width, with the ecliptic as a medial line. Within this band lie the apparent paths of the sun, moon, and planets. The zodiac is divided into 12 signs, or divisions, of 30° each, covering the passage of the sun from one vernal equinox to the next, and in ancient times these signs were marked by twelve constellations from which they took their names. By reason of precession the constellations of the Greek astronomers no longer mark the signs of the modern zodiac but are 30° to the east of them.

The twelve constellations of the classical zodiac are as follows:

- | | |
|----------------------|----------------------------|
| 1. Aries, the Ram | 7. Libra, the Balance |
| 2. Taurus, the Bull | 8. Scorpio, the Scorpion |
| 3. Gemini, the Twins | 9. Sagittarius, the Archer |
| 4. Cancer, the Crab | 10. Capricornus, the Goat |
| 5. Leo, the Lion | 11. Aquarius, the Waterman |
| 6. Virgo, the Virgin | 12. Pisces, the Fishes |

It is unnecessary to discuss in detail the history and distribution of the various zodiacal conceptions in the Old World. The agricultural and pastoral peoples of western Asia were noted stargazers. Among them the rising of certain constellations in the morning twilight may have been used to indicate the time for important festivals. They observed that the sun, moon, and planets followed a definite path across the sky and they picked out various star groups as markers by which the unequal progress of these luminaries could be measured. While the time periods of the apparent or synodical revolutions of these orbs—taken from one rising or setting with the sun to the next—might likewise be observed, the organization of a zodiac naturally led to the determination of true or sidereal revolutions. The further use of the zodiac in the nefarious art of forecasting events is well known.

The classical zodiac may be called a solar zodiac although in reality its time period is the sidereal revolution of the earth. Each sign may originally have served to mark the advance of the sun among the stars from one new moon to the next. But since twelve moons fall several days short of a year a readjustment was necessary and the signs were lengthened slightly till they closed up the circuit of the heavens. The Greeks obtained their zodiac from the Assyrians and after enriching it with mythological instances they passed it on as a heritage to western Europe.

A lunar zodiac of twenty-seven or twenty-eight mansions served to mark the daily progress of the moon among the stars and the period of this zodiac was therefore the sidereal revolution of the moon. The lunar zodiac seems to have had its greatest vogue in India. The so-called zodiac of the Chinese may be entirely independent and apart from the zodiacs of western Asia.

We can do little more than conjecture the antiquity of the zodiac in Mesopotamia. It is pretty certain, however, that it rose after the invention of agriculture. We cannot be sure that the earliest notices of constellations of the ecliptic indicate that the concept of the zodiac had already been organized. The sign of Taurus appears to have been the earliest one to begin the cycle which would indicate that the zodiac was formulated about 2500 B.C. In its present sequence, with Aries as the first sign, the zodiac dates from the Greek period. Let us now examine some of the general arguments against the theory that the zodiac was introduced from the Old World into the New before the time of Columbus.

It is generally admitted that America was originally populated from Asia, but on a culture horizon no higher than the neolithic. The simple arts of stone chipping and basket-making were probably brought over by the earliest immigrants but there is abundant evidence that pottery-making, weaving, and agriculture were independently invented long after the original settlement. The cultivated food plants are different from those found in the Old World and there is a vast region in northwestern America and northeastern Asia upon the only obvious line of communication where agriculture and the higher arts have seemingly never been known.

Mr. Stansbury Hagar¹ admits that a knowledge of the zodiac could not have come with the first influx of man into America and that it must have come through accidental or sporadic communication at some later time. He also eliminates the possibility of communication from western Europe and apparently rests his case upon the familiar and romantic device of the venturesome Chinese junk or the ubiquitous Phoenician galley. Granting that vessels in ancient times might have been cast up on the shores of America, what likelihood is there that shipwrecked sailors could introduce such a complicated idea as the zodiac? We know that Scandinavian settlements held their own for several hundred years in Greenland and that journeys were made to Labrador for timber, but we find no trustworthy evidence of influence upon the Northern Indians either in objects or ideas.

There are a small number of anthropologists, such as Graebner, who have assumed an historical explanation for the close similarities in ideas, in social and religious structures, and in material art that are found between otherwise distinct peoples in the New and Old Worlds. The weight of evidence indicates that these similarities should be explained by psychic unity and convergent evolution, rather than by contact and transmission. It is generally admitted that human beings are everywhere so similar in mental structure that they are apt to return the same answer to the same problem. Tools and many other objects of material culture are made in response to insistent and universal needs. Materials while not everywhere the same fall into certain general classes. Mechanical possibilities are often so limited that independent invention of practically the same object is often seen in different parts of the world. Sometimes objects or ideas with diverse original forms modify towards similar resultant forms. Archeological and ethnological science finds it unwise to assume actual connection in the past between peoples who in the present are widely sundered unless there is a bond of language or strong proofs that a considerable number of technological and intellectual concepts have a common origin. In almost all cases where real connection has been proven

¹ 1912c, pp. 47-48.

the phenomenon of divergent evolution is important. This is the very opposite of the convergent evolution which to uninitiates furnishes material for phantastic theories.

The history of American civilizations has been blocked out in the rough. The sequence of culture in Mexico and Central America, in particular, has been carefully studied. The most remarkable features were developed from crude beginnings in a manner that is capable of demonstration. Food plants, especially maize, having been domesticated and agriculture put on a firm basis somewhere in Mexico or Central America, new possibilities for human society arose. The pressure of the population upon the food supply was reduced and this doubtless led to a great increase in numbers and to an added effectiveness in coöperation. We have every reason to believe that agriculture passed from this original center over a large part of North and South America and that with it went certain tools and ceremonies which became more or less modified in dispersal. Now agricultural peoples are sedentary and they are more deeply concerned with seasonal changes and astronomical facts than are ranging hunters. There is pretty clear evidence that rough lunar calendars were originally used by the tribes of Mexico and Central America as they are today by the nomadic Indians of North America. But these crude time counts were perfected and the phenomena of the heavens were duly observed and noted after the Indians had acquired permanent habitations and much leisure. It is well known that the Mayan and Nahuatl tribes were able to determine with great exactness the length of the year and to calculate the synodical revolutions of the moon, Venus, and other planets. In Peru the knowledge was less extensive but the solstices and equinoxes were carefully measured and Venus was recognized in her double guise as Evening and Morningstar. We must not forget that the most remarkable features of the Central American time counts are absolutely without parallel in any part of the world. They were based not alone upon astronomical facts but also upon a peculiar system of numbers.

Let us now examine the evidences bearing on the zodiac in America presented in several papers by Mr. Hagar. He professes

to find proof that the zodiacal divisions were known to the Pueblo Indians of the Southwest, to the Mayan, Nahuatl, and Zapotecan tribes of Mexico and Central America, and to the Peruvians. While he constantly uses the classical zodiac for purposes of comparison he constructs for the nations of Mexico and Central America several variations. First, there is a zodiac of ten parts based on pictures in native books and on random information in Spanish historians of the second crop. Second, there is the normal zodiac of twelve parts reflected in mural decorations and in the arrangement of pyramids at Izamal, Teotihuacan, etc. Third, there is the sequence of the eighteen months of the year, and fourth, the sequence of the twenty days of the month. Both of these are warped into agreement with the normal zodiac.

One half of a ten part zodiac Mr. Hagar finds in the constellations given by Tezozomoc¹ where this historian recites the list of duties read to a newly elected king.

"You must take special care to rise at midnight [and study these stars], Yohualitqui Mamalhuaztli, as they call the Keys of St. Peter among the stars of the sky; Citlatlactli, the North and Its Wheel; Tianquiztli, the Pleiades, and Colotl Ixayac, the constellation of the Scorpion. These are markers of the four parts of the world according to the heavens. And towards dawn you must observe carefully the constellation Xonecuilli, the Cross of St. Jacob, which appears in the southern sky."

Seler² has reproduced plans of all five star groups from the original manuscript of Sahagun who refers to three of them by name in his published texts.³ Both Seler and Hagar⁴ attempt to match the rather conventional plans of Sahagun into star charts. One of the earliest and at the same time the fullest discussion of these stars is that of Paso y Troncoso.⁵ Information and opinion may be summed up as follows.

Mamalhuaztli means the Fire Drill (consisting of a vertical and a

¹ 1878, p. 574.

² Bull. 28, pp. 355-358; additional information, Seler, 1902-1908, I, pp. 618-623.

³ 1880, p. 482 and Bustamanti Edition, I, p. 346.

⁴ 1910, p. 278.

⁵ 1882, pp. 388-398.

horizontal stick) and the supplementary terms Yohualitqui (Tezozomoc) and Yoaltecutli (Sahagun) mean, respectively, Night-bringer and Night-lord. Sahagun makes the definite statement that this constellation is near the Pleiades in Taurus. The published text of Tezozomoc gives the Keys of St. Peter (a star in Aries) as an equivalent Spanish term, but Seler suggests that *nave* (ship) was misread *llave* (key) in manuscript. The Ship of St. Peter is formed by seven stars in Taurus with Aldebaran as the principal one. Paso y Troncoso¹ discusses this constellation fully and after stating various opinions agrees with Molina that it lies in Gemini but his arguments, based upon an identification of this constellation with The Wands (*Los Astillejos*) do not seem sufficient to overrule the statement of Sahagun. Orozco y Berra² suggests the Belt of Orion for the three stars associated with the advent of night, while Robelo³ agrees with the majority in placing the constellation Mamalhuaztli in Taurus. Hagar⁴ is forced to choose Cancer by the exigencies of his thesis and is able to find a star grouping that agrees fairly well with the plan of Sahagun but that has nothing else to be said in its favor.

Citlatlactli means the Star Ball Ground although explained by Tezozomoc as the North-and-Its-Wheel. It is constructed by Seler out of circumpolar stars.

Tianquitzli, the Market, is definitely stated by Tezozomoc to be the Pleiades. It was also called Miec, the Heap. This constellation is said to have assumed special importance among the Aztecs in connection with a new-fire ceremony at the beginning of a 52-year cycle. Sahagun's plan agrees with this group (although supernumerary stars are shown as in other cases) and it is quite unnecessary for us to accept the suggestion that the inconspicuous stars of Virgo are represented.

Colotl, the Scorpion, or Colotl Ixayac, the Scorpion Face, is the Aztec name for a constellation possibly identical with Zinaan Ek, the Scorpion Stars of the Maya. Assuming that this constellation marked the cardinal point west for the Mexicans, Seler argues that

¹ 1882, pp. 390, 396-397.

² 1880, I, p. 32.

³ 1905, pp. 238-239.

⁴ 1910, p. 286.

it could hardly have been the classical Scorpio which lies far south of the Equator. He then offers the suggestion that stars in Boötes made up this group and that Arcturus instead of Antares was the "heart of the scorpion." If the scorpion star groups of the New and Old World are really the same we have indeed a remarkable coincidence. Still the constellation is a very brilliant one, the curved tail is a conspicuous feature and the Aztec word for scorpion means curved. As far as the statement of Tezozomoc goes, Seler has no support in his assumption that the star group marked west rather than south. In fact he deliberately includes a fifth constellation, not named as a direction marker, for south and then takes the Pleiades from the west to mark the center or zenith. A modern star map of the Huichol¹ represents the Scorpion with the claws opening towards the west but it stretches across the sky and can hardly be said to mark this cardinal point. Indeed, Seler² seems to defeat his own arguments by interpreting a symbol at Chichen Itza as referring to the conjunction of the planet Venus with a star group in the form of a scorpion. Such a group must lie close to the ecliptic and there is a possibility that it might be the classical constellation of Scorpio.³ This matter will be taken up again. Mrs. Nuttall⁴ identifies Colotl with Ursa Major.

Xonecuilli has been variously identified as the Southern Cross and Ursa Minor. The name means Twisted Foot and refers to its s-like shape. The constellation may have been connected with the god Mixcoatl.

Taking the Aztec star groups, already described, in the order given by Tezozomoc in the passage quoted above Mr. Hagar identifies them with the following classical signs:

- | | |
|------------------|-------------------|
| 1. Mamalhuaztli | Cancer |
| 2. Citlatlachli | Leo |
| 3. Tianquiztli | Virgo |
| 4. Colotl Ixayac | Scorpio and Libra |
| 5. Xonecuilli | Sagittarius |

¹ Lumholtz, 1900, p. 57.

² Seler, 1910, pp. 162-165.

³ Paso y Troncoso, 1882, p. 388.

⁴ Nuttall, 1901, pp. 8-9.

It is apparent that he has seized upon Scorpio (represented by name in both lists) as a point of departure and has counted forward and backward from this constellation along the classical zodiac. The statement made by Tezozomoc himself that the first four of these star groups marked the four directions is a pretty sure indication that they did not form a continuous series along the ecliptic. Besides, we have the word of Sahagun that Mamalhuaztli is in Taurus, rather than in Cancer, and we know that Tianquiztli (the Pleiades) is in the same sign.

Only the second half of the zodiac of ten parts, made possible by joining Scorpio with Libra and Aries with Taurus, is seen by Hagar in the star groups given above. He finds, however, a complete zodiac of this type pictured forth in pages 46-50 of the Dresden Codex. On each page are three pictures. The upper picture represents a god seated on a celestial throne and holding a bowl. The middle picture shows a divinity with spears in one hand and a spear thrower in the other. The bottom picture shows an individual into which a spear has been thrust. In one case this is a jaguar, in another it is God E, and in a third it is God K. Interpretation of these pictures is difficult but Hagar sees in the two lower figures on each page a dominant zodiacal sign and its conquered opposite.

Although the pictures are ambiguous the calculations are unmistakable. Each of these five pages deals with 584 days and together they deal with five times 584 or 2920 days and with thirteen times 2920 or 37960 days. This number 2920 equals eight solar years as well as five synodical revolutions of Venus. Now if the pictures represented a zodiac we should expect to find the sidereal revolutions of Venus dealt with rather than the synodical. Although this number of days almost exactly equals thirteen sidereal revolutions of the planet there is not the slightest evidence that the authors of the codex were aware of the fact. According to Seler, the pictures already referred to have very close analogues in a number of Mexican manuscripts including the Codex Borgia, the Codex Vaticanus B, and the Codex Bologna. They represent the fatal influences of Venus for each one of its five revolutions. In the *Anales de Quauhtitlan* the influences are recorded as follows:

1. In the sign Cipactli it shoots the old men and women.
2. In the sign Coatl it shoots the rain; it will not rain.
3. In the sign Atl there is universal drought.
4. In the sign Acatl it shoots the kings.
5. In the sign Olin, it shoots the youths and maidens.

These five signs are the names of the days with which the 584-day periods begin. In the Dresden Codex they are Cib, Ahau, Kan, Lamat, and Eb. The numbers associated with each sign may vary from 1 to 13 through the entire Venus calendar round of 65 revolutions or 104 years.

The correlation between the zodiacal constellations and the day and month names current among the Mexican and Central American tribes, which Hagar has presented in a number of papers, is a monument to ingenuity. It is well known that the series of named days agrees in meaning in the different languages of this area while the tonalamatl (or permutation cycle of twenty names and thirteen numbers) everywhere begins with equivalent days. (Imix for the Maya, Cipactli for the Nahuatl, Chijilla for the Zapotec, etc.) But as regards the months there is no such agreement. The names in the different languages are entirely unrelated in meaning and while there may be a common point of departure in time this has not yet been determined.

On the Aztec Calendar Stone the twenty days are represented on one of the outer bands that decorate the disk of the sun. But this circumstance alone gives little support to Mr. Hagar's statement that the circle also represents a zodiac. He assumes that the four great rays represent the solstice and equinoxes and even ventures to point out which one marks the vernal equinox. Here he makes his beginning with the day Acatl and distributes unequally the twenty days to the twelve signs in sequence, with one, two, or three days falling to each sign. Since the concordance of Mexican and Maya days is perfectly known he has no difficulty in extending his correlation to the Maya calendar.

The Mexican days are mostly named from everyday animals and objects. It is possible that some of these names were also given to special stars or to constellations although Mr. Hagar has furnished

no real evidence on this question. In the Bodleian Manuscript, which seems to deal largely with astronomy, there are a number of figures of great stars with identifying glyphs attached. A Flower Star is drawn several times and an Eagle Star is also given. In one picture is shown an Ocelotl head with three star symbols (round eyes) attached: this may represent a constellation. These star signs are mostly used as the names of persons, but possibly we may be justified in supposing that they represent named stars since the observation of stars through notches and forked sticks is pretty clearly shown in this codex. However, simply because three names of Mexican days are also given to stars we must not jump to the conclusion that the other seventeen names exhibit a similar usage. The Cloud or Smoke Star, the Butterfly Star, etc., in the same manuscript do not belong to the day name series.

Another writer, Mr. Hermann Beyer, constructs a zodiac for the Mexicans, namely one of thirteen parts, in which the days are distributed in a fundamentally different fashion. He argues that the two "plumed serpents" that surround the disk of the sun on the Calendar Stone represent the ecliptic. These monsters have been named Xuihcoatl and it seems likely that they are related to the Two-headed Dragon of the Maya (which does not always have two heads). It is true that this earlier concept often bears symbols of astronomical import from its elongated body but these symbols do not occur in a definite sequence as they would have to do if a zodiac were represented. Out of the stars of Taurus Mr. Beyer constructs the head of Xuihcoatl. He then identifies this head with Cipactli, the first of the Mexican day series. Now it is pretty certain that Cipactli and its Maya equivalent Imix do refer to some monster but that they refer to Xuihcoatl is pure guesswork. Given a starting point, Mr. Beyer names the thirteen zodiacal divisions as follows:—

1. Cipactli, 2. Ocelotl, 3. Mazatl, 4. Xochitl, 5. Acatl, 6. Mizquintli, 7. Quauhuatl, 8. Malinalli, 9. Coatl, 10. Tecpatl, 11. Cuetzpalin, 12. Ollin, 13. Itzcuintli.

These days are the beginning days of the first fourteen divisions

of the formal tonalamatl except that often the tenth sign (Tecpatl) the day Ozomatli is taken out to represent the polar sky. The series of days given above covers in the tonalamatl a period of fourteen times thirteen or 182 days—or one half of a 364-day year. As we shall see presently the so-called ritualistic year of 364 days is divided a number of ways, among others into thirteen times twenty-eight and twenty-eight times thirteen. Whatever might be said in favor of these divisions being reflected in astronomical symbolism cannot be construed as an argument that thirteen divisions of the ecliptic were named in accordance with the list of days given above. If the list covers, let us say, the first half of a year it will not occupy the same position again for thirteen years and in the meantime will continually occupy a variety of other positions separated by intervals of seventy-eight days (the rest of the tonalamatl after 182 days have been counted out). Such a series of names would be completely out of harmony with star groups along the ecliptic which make their revolution in a sidereal year.

In the curious book called *Tardes Americanos*¹ published in 1778, and written in the form of a dialogue between an Indian and a Spaniard, there is what purports to be a native zodiac. On analysis, however, it turns out to be a distorted tonalamatl. There are said to be twenty signs for the sun's annual course, for each sign thirteen houses and for each house seven characters. The twenty signs are the twenty days of the month in their usual order. The thirteen houses are the first thirteen days of the month and the seven characters are the remaining seven days of the month. Of course, no such arrangement can be made to cover a year.

Humboldt, on the rather slender basis of the evidence available in his day, contributed to the misconception of a Mexican zodiac in which day names played a part. His method of procedure was different from any of those just explained. He simply pointed out that a number of Mexican day names had the same, or approximately the same, meanings as zodiacal names from Tibet,² India, and other parts of the Old World. But Humboldt did not pretend

¹ Granados, 1778, pp. 63-67.

² Op. cit., p. 157 et seq.

that these similar names were found in the same order, nor did he prove that they were given to a zodiac in Mexico although inferring that they were. Several writers, then, have attempted to use Mexican day signs in the construction of a zodiac, but the entire lack of agreement among them is a strong argument against any one of them being right.

The eighteen months of the year are distributed by Hagar over the twelve signs of the zodiac in a fashion that is somewhat irregular. A naïve effort seems to have been made to find the Aztec and the Maya month in which the vernal equinox fell during the first half of the sixteenth century and to use this as a point of departure by identifying it with Aries. At this time the constellation of Aries was already warped about 25° out of its theoretical position by the precession of the equinoxes. Unfortunately Mr. Hagar does not seem to have grasped the exact character of Mexican and Central American time counts because his correlation is considerably awry. Let us examine the table of correspondences for the first three signs.

Sign of classical zodiac	Aztec month	Maya month
Aries	Atlacualco	
	Tlacaxipeualiztli	Mac
Taurus	Tozoztontli	Kankin
	Ueitocoztli	Muan
Gemini	Toxcatl	Pax

Atlacualco is given by several writers as the first month of the Mexican year and its beginning is ordinarily placed in February. But accounts differ pretty widely both as regards Atlacualco being the first month and the day on which it began. If we accept the statement that the year bearer was the initial day of the year (and there seems to be little doubt on this point) it follows from the few exact dates that have come down to us that Toxcatl was the first month.¹ At any rate we have reason to believe that Atlacualco fell on the 6th of February, Old Style, in 1521, or on February 16th of our present calendar. It can be clearly demonstrated that the leap year error was not interpolated in Mexican or Central American year counts, although calculated very accurately, and that

¹ Compare Seler in Bull. 28, pp. 135-143.

the months thus fell behind the seasons at the rate of about twenty-four days to a century. The differences among the various authorities on the beginning days of Mexican months is largely to be explained by this retrogression as well as by the changes instituted in the European calendar by Pope Gregory in 1582.

Tlacaxipeualiztli, the second Mexican month according to some authorities and the first according to others, began in 1521 on March 8th of our present calendar. It took its name from Xipe, the Lord of the Flayed. The cult of this divinity spread from Central Mexico to Salvador and among the Quiché and the Cakchiquel; one of the months was named after this god. In a Cakchiquel calendar dated 1681 the month Tacaxepual is given as the first month of the year and its beginning is placed on January 31st. Counting forward the number of days lost through the failure to correct the leap year error brings us within a day or two of the beginning day of Tlacaxipeualiztli in Mexico in 1521. In the commentary that accompanies this calendar is the statement:

"Because since neither the Mexicans nor these [the Guatemalans] understood leap year day . . . they drew apart and became different from our calendar, and as neither these nor the Mexicans always commenced their year on the first of our February but each four years they lost a day: that is the year 1681, that of '82, that of '83 and that of '84 commences the year of the Indians of this kingdom on the first of February and that of 1685 will commence on the 31st of January and that of 1805 will commence of the first of January and four years thence on the 31st of December, etc."

We have here a clear explanation of the retrogression of the Mexican and Central American calendar. It has long been recognized that interpolated corrections would vitiate the elaborate calculations of the Maya where solar, lunar, and Venus periods are correlated over vast stretches of time. The significance of this indisputable fact in relation to the theory of the zodiac is this. The months could not possibly maintain a close time relation to the signs of the zodiac as Mr. Hagar assumes they did maintain. Even if we should admit that Atlacualco and Tlacaxipeualiztli coincided with the vernal equinox or with the constellation of Aries during the

first years of the Spanish conquest this correlation would not hold for the future and what is more important could not have been true in the past. These two months in 1521 embraced the period between February 16 and March 27 N.S. and barely included the vernal equinox. The sun, however, did not actually enter the constellation of Aries until April was well under way.

Corresponding to these two months he selects only the month Mac from the Maya calendar. Now if we add to the date given by Landa the necessary 10 days to bring it into New Style (Landa died in 1579 and his *Relacion* was written before 1566) we find that the month Mac extended from March 13 to April 1, N.S. To bring this date into conformity with the year 1521 we should put these limits ahead some eight or ten days, thus making up for the loss through leap year interpolations in the European calendar between 1521 and the year when Landa wrote his book.¹ The single Maya month which is given as the zodiacal equivalent of two Mexican months falls entirely out of the range of these two months. Now it is perfectly clear that Mr. Hagar believed he was safe in taking Mac as the month in which the vernal equinox fell. Förstemann had written a number of papers on the supposed positions of the solstices and equinoxes in the Maya months. In these papers there is no doubt that the eminent Americanist proceeded from a false assumption to a false conclusion. This unlooked for failure of the months to occupy fixed positions in the year furnishes an acid test for all the petty details and circumstances which Mr. Hagar has advanced as supplementary proof of his theory.

The figure of the Scorpion, whenever found, serves Mr. Hagar as an infallible indicator of the zodiacal sign of Scorpio. A recent paper by him is devoted principally to this sign in relation to the Maya month Tzec and the day Manik. Arguing from the correlation of the Maya months with the European calendar as given by Landa he is able to make the month Tzec correspond in time with the entrance of the sun into the sign of Scorpio. The month name Tzec is given the meaning scorpion on very doubtful grounds. It is represented

¹ If 1541 had the year bearer 13 Kan as Nakum Pech states then the sample year of Landa with the year bearer 13 Kan must have been 1553. The correlation for 1521 would necessitate the addition of eight days.

by a uniform hieroglyph on the monuments and in the codices over a long period. Moreover the retrogression of the months at the rate of about twenty-four days in a century would soon warp it out of all time relation with its original position in the year.

The glyph Manik is also practically identical in ancient and modern forms, and everywhere represents a partially closed hand. It seems to be phonetically connected with the Maya word "to grasp." The day signs in the Books of Chilán Balam are practically worthless since in only a few instances do they agree with the forms preserved by Landa, while these in almost all cases can be definitely connected with the glyphs in the ancient inscriptions. Mr. Hagar finds two anomalous glyphs called Manik in these late manuscripts and sees in them a picture of the "conventionalized tail and sting of the scorpion." These glyphs are figured by Mr. Hagar¹ and the writer for one fails to find grounds for such identification.

On pages 38 to 49 of the *Tro Cortesianus* codex are a series of pictures and *tonalamatls* dealing with the chase. In the last half of this section are eighteen pictures of game caught in snares and traps. In sixteen cases the game is a snared deer, in one case it is an armadillo caught in a deadfall trap and in one case it is a snared peccary. The rope which makes the snare is fastened in fourteen instances to a tree or post and in three instances to the tail of a figure that doubtless represents the scorpion. The exact significance of this picture is unknown but the series as a whole has to do with hunter's luck and the black God M who seems to be a god of hunting often has a scorpion's tail attached to his belt as a symbol. The scorpion's tail in these pictures ends in a hand. Mr. Hagar identifies these pictures with the zodiacal sign of Scorpio and the month Tzec and the hand with Manik. The snared deer is the opposite sign of the zodiac. Surely such an identification must be called the wildest of guesses.

As concerns the grouping of mounds at Izamal and San Juan Teotihuacan in accordance with the zodiac the opinion of Mr. Hagar in neither case is based upon a study of the archeological remains. For Teotihuacan he depends upon two maps, probably apocryphal,

¹ 1915, p. 489.

both of which come far from giving a faithful plan of the city. As for Izamal the curious account of Lizana does not justify the conclusions drawn from it nor does the rough survey of the remains of this site made after the theory was formulated compare with the hypothetical plan. It would take us too far to criticize in detail Mr. Hagar's paper on Acanceh but his general conclusions have the same inherent errors hitherto observed.

Mr. Hagar also writes on the zodiac among the Peruvians. He sees twelve signs pictured forth in a crude seventeenth century manuscript. Most of the pictures, accompanied by notes in Spanish, Quechua, and Aymara, undoubtedly relate to the heavens. The sun, moon, morning star, evening star, rainbow, etc., are clear enough. Some of the remaining figures may relate to constellations but internal evidence that they relate to a series of zodiacal constellations is conspicuously absent. Mr. Hagar identifies four of the signs after round-about arguments, and then practically assumes that eight others fill out the zodiac. Let us examine the proof of the four in question.

1. The inscription in Quechua reads "Puma lance." Support for identifying it with the sign of Leo is found in priestly writings but all we know for a certainty is that somewhere in the heavens there was a Puma star.

2. The cloud-like figure bears the inscription "Winter cloud" in Spanish and "harvest" in Quechua. Mr. Hagar identifies this with the Pleiades and by extension with Taurus. He admits that the Pleiades was called "the granary" by the Peruvians, but thinks the crude sketch is doubly symbolic of a cloud and an ear of corn!

3. The larger enclosure bears the label "Mother ocean" in Quechua while the smaller one is named "spring." Then there is another word which is translated "umbilicus." And after this the road is clear through Assyrian symbolism to the sign of Aquarius.

4. The sketch bears the Spanish inscription "tree" and an Aymara word which also means tree. But this second word has other meanings such as "king," "mummy" and "immortal." The constellation of Scorpio, associated with festivals of the dead the world over, is here pictured forth as a tree although it would be possible to construct a mummy out of some of its stars!

Where the clearest proofs are as tenuous as in this instance, the admittedly speculative parts are quite beyond discussion. Needless to say other zodiacs constructed for Peru vary from this as far as fancy can range.¹

How anyone writing on Peruvian astronomy can deliberately ignore Garcilasso de la Vega, who with all his faults, must be considered our best authority on the civilization of the Inca, is inexplicable. By this writer the range of Peruvian astronomical knowledge is thus summed up: "They knew not what caused the increase and wane of the moon, nor the movements of the planets; nor did they take account of more than three planets, and those owing to their size, splendour and beauty. They did not know of the other four planets. They had no ideas of the signs of the zodiac, much less of their influences. They called the sun Yuti, the moon Quilla and the planet Venus Chasca, which means curly from its numerous bright rays. They also observed the seven little goats (Pleiades) from being so close together, and from the difference they saw between them and the other stars, which excited their wonder. They did not watch the other stars, because having no necessity for so doing they knew of no object to be gained by examining them nor had they more special names for the stars than the two already given."²

Of course it was not strictly true that the Peruvians had names for none of the remaining stars. But the list is not very long and zodiacal constellations are not conspicuously represented.³

In all his papers Mr. Hagar has not presented a single sound and convincing argument, in the opinion of the present writer, that the classical zodiac was introduced from the Old World into America. That a considerable interest was aroused in the zodiac after the Conquest there can be little doubt. A large part of the Book of Chilán Balam of Kaua is an almanac set over rather clumsily into Maya. The Ptolemaic conception of the universe is presented in diagram with the eleven heavens bearing their Latin names. The year of fixed and movable feasts is given in full as well as a

¹ Lopez, 1868, pp. 322-343; Krum-Heller, 1912, etc.

² 1869-71, pp. 175-176.

³ See, for instance, Acosta, 1590, pp. 209-210.

zodiac with pictures of the various signs. The translations of the European names are naïve. Thus Gemini is *catul polal*, "two sons"; Pisces is *cacot cay*, "two fish"; Taurus is *vacax lae*, "a cow it is"—the word *vacax* coming from the Spanish *vaca*. Surely if the Maya had known a zodiac with comparable divisions they would have disclosed the fact in this manuscript.

Zodiacs have been imagined for other American Indian tribes. L'Heureaux¹ claims that the Blackfoot have such a belt of constellations, apparently derived from the Aztecs. A recent German writer² establishes the record for absurdity by constructing zodiacs out of the clan names of the Zuñi, Sia, Iroquois, etc.

There is, however, an entirely different problem connected with the zodiac touched on hardly at all by the writers mentioned above. Since the ecliptic is real and permanent and since the stars that lie close to it can be used to mark the progress of the planets without being grouped as in the Old World it is not impossible that a conception akin to the zodiac should have arisen independently in the New World and especially in the region where careful observations of the planets are known to have been made. We know that the sidereal revolutions of the heavenly bodies were well known to the Assyrians and that this knowledge is directly traceable to the formalization of the zodiac concept. Dependable proof of the existence of any sort of zodiac in the New World is to be found not in the far-fetched interpretation of symbolic acts and designs which stand service to the preconceived notions of this or that writer, but in calculations that reflect a knowledge of sidereal time periods and in picture series combined with such calculations.

The natural cycle of the zodiac is the sidereal year. The difference of only twenty minutes between the tropical and sidereal year—mostly accounted for by the precession of the equinoxes—would probably not be observed by nations on a moderate plane of culture. But in the long run this slight difference of a day in seventy years would make itself felt.

There is considerable evidence that the rising of prominent stars

¹ 1868.

² Bork, 1913, pp. 41-46.

and constellations in the morning or evening twilight was duly noted by certain American Indian tribes and that the civil or ceremonial calendar was regulated to some extent by those occurrences. Most tribes were doubtless as well aware of the annual changes in the heavens as they were of the diurnal ones. Star lore among the Hopi, the Pawnee, etc., seems to have gone much farther than is generally supposed, possibly through dissemination of the astronomical knowledge of the Mexicans.

While in the case of the earth itself the difference between the sidereal or true revolution and the tropical or seasonal one is so slight as to be almost negligible this is not the case with the sidereal and synodical revolutions in general. The synodical or apparent revolution of a planet is really not a revolution at all, it is simply the time necessary for the earth to gain or lose a lap in an unequal race round the sun. In the case of the moon the difference is likewise considerable although explainable upon other grounds.

<i>Planet</i>	<i>Sidereal Revolution</i>	<i>Synodical Revolution</i>
Earth	365.26 days	365.24
Moon	27.32	29.53
Mercury	87.97	115.88
Venus	224.70	583.92
Mars	686.95	779.94
Jupiter	4332.58	398.87
Saturn	10759.22	377.75

The sidereal revolution of the moon takes between twenty-seven and twenty-eight days. The European week of seven days came from the east and it has been explained as a quarter of the lunar period as measured by the lunar zodiac. A period of twenty-eight days divided into four weeks of seven days seems to have been known to Central American nations. If such a twenty-eight day month is taken thirteen times we have a 364-day year. In the Dresden and Peresianus codices are calculations dealing with such a year (called by Förstemann the Ritualistic Year) and several vague references to it are found in early writings. Padre Marquez says of the Mexicans: "They divided, in the second place, their year into 28 other periods of 13 days each, or 364 days, leaving one to the end which was considered the most unlucky of the five

nemontemi." But in reality thirteen sidereal lunar months equal only 355.16 days. This sum falls more than ten days short of the true year. It is difficult to see how so poor an approximation as this can offer proof that the progress of the moon among the stars was duly noted. It is much more likely that the 364-day year was chosen for mathematical reasons: this number contains a different set of factors than does 365.

The ritualistic year was divided in a number of ways. First the important tonalamatl period (260 days) is supposed to have been taken out leaving a remainder of 104 days. According to one hypothesis the principal tonalamatl was the one occupying the middle position in this year with 52 days before and after, one quarter of the ritualistic year or 91 days was assigned to each of the Bacab gods who controlled the four directions. The ritualistic year was also divided into thirteen times twenty-eight days, twenty-eight times thirteen days and fifty-two times seven days.

On page 32a of the Dresden Codex is a condensed time count taking the following form:

13	13	13	13
Manik	Cib	Chicchan	Ix
Chuen	Ahau	Muluc	Eznab
Men	Kan	Ben	Ik
Cauac	Lamat	Caban	Cimi
Akbal	Eb	Imix	Oc

Each row of day signs bears the number 13 and if we begin with 13 Ix in the upper right-hand corner and proceed towards the left to 13 Chicchan we find that 91 days have elapsed. The same interval exists between 13 Chicchan and 13 Cib, 13 Cib and 13 Manik; 13 Manik, and 13 Eznab, etc. In other words each horizontal row accounts for four times 91 or 364 days and the five rows account for five times 364 or 1820 days. This equals seven times 260 days and as a result forms a continuous wheel: that is, the last date, 13 Akbal, is exactly 91 days from the first day 13 Ix. Curiously enough the presentations of the Ritualistic Year in the codices have in most cases to be read backwards.

Förstemann attempted to analyze the long numbers that accompany this block of glyphs but was successful only in showing a remarkable series of common multiples. It is evident, however, that the 364-day year was carried along in calculations over great stretches of time. In the inscriptions the numbers 5-1-0 (five times 364) occurs frequently.

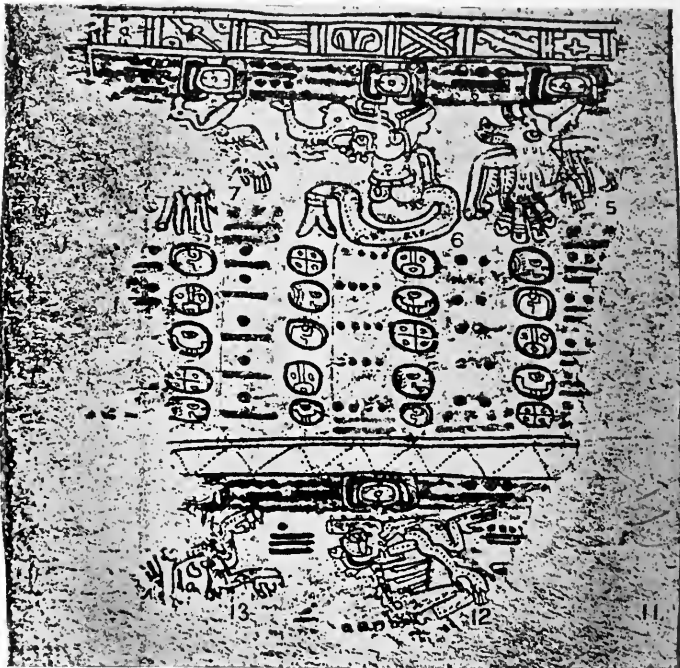


FIG. 1. Plate XXIII, Codex Peresianus.

The most important passage in the codices for its possible bearing on a zodiac will now be treated in some detail. On the last two pages of the Peresianus Codex (Plates 23 and 24 of De Rosny's reproduction) are two rows of animal figures in connection with celestial shields and sun symbols. In the upper row the celestial shields are suspended from a constellation band that passes across both pages. In spite of a partial scaling away of the painted surface we may be sure that the constellation band turned downward at the

left and although it might have been cut off short at the right end, there is little doubt that the constellation band formed the elongated body of a Two-headed Dragon. This subject may have been represented with both heads as on Plate 22 of this manuscript or with only the front head as on Plate 76 of the Dresden Codex. The calculations on these two pages can be made complete, as we shall

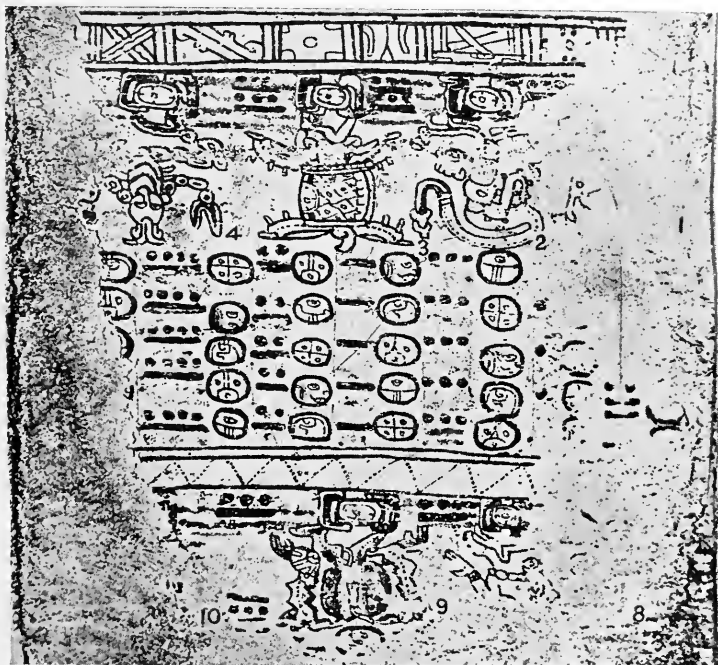


FIG. 2. Plate XXIV, Codex Peresianus.

see, and there is little likelihood that the design was continued on succeeding pages now lost. There are seven animal pictures in the upper row, three on Plate 23, and four on Plate 24. The figure on the extreme right is almost destroyed. The celestial shields of the lower row are attached to a horizontal strip with no other markings than a zigzag dotted line. The figures here are much destroyed but it seems likely that three were originally drawn on each page. Counting the two rows we should thus have thirteen animal figures, each one connected with a symbol of the sun (Figs. 1-2).

Between the two picture series just described are columns of day signs with numbers. They are arranged systematically in columns and rows. The series becomes continuous as Seler and Förstemann have shown, only if we count horizontally from right to left. We then find that each of the five rows has thirteen numbers. The numbers increase by two toward the left. Only five days are represented, namely, *Lamat*, *Cib*, *Kan*, *Eb*, and *Ahau* and in the five rows the permutation of these days with the thirteen numbers is exhausted. If we begin with 12 *Lamat* in the upper right-hand corner and proceed horizontally across the two pages we find a continuous difference of twenty-eight days between adjacent members.

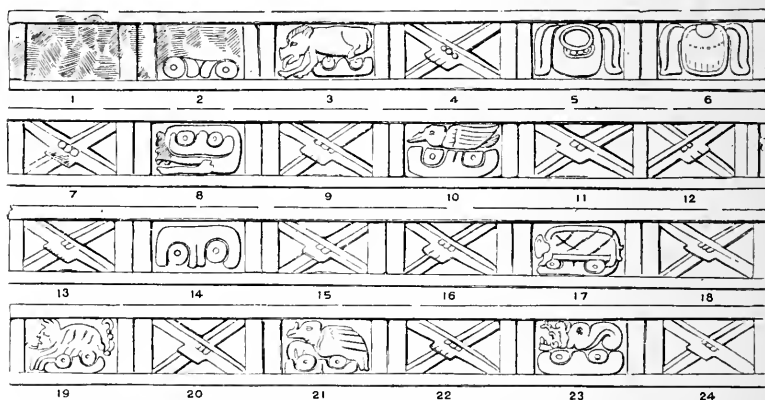


FIG. 3. Star symbols over the doorway in the east wing of the Casa de Monjas, Chichen Itza.

Thus 1 *Cib* is twenty-eight days in advance of 12 *Lamat* while 3 *Kan* is another twenty-eight days in advance of 1 *Cib*. Each row then represents thirteen times twenty-eight or 364 days and the five rows equal five times 364 days or 1820 days. This sum as we have already seen is equal to seven times 260 days and as a result the first day sign of the sixth row—if one should be added—would again be 12 *Lamat*. There are other numbers appearing on these pages which serve some unknown purpose. Thus between each celestial shield there are one or two 8's, and at various points above and below the day sign series there are numerals in blue which may be corrections.

The essential point is that we have here five of the so-called Ritualistic Years, consisting of 364 days and divided into thirteen periods of twenty-eight days each. Now the twenty-eight day period is closer to the sidereal than to the synodical revolution of the moon and it is conceivable that it might have served as the basis for a zodiac. The thirteen animals holding in their mouths the sign of the sun might therefore represent thirteen signs of a zodiac. The pictures are probably to be taken in the same order as the calculations or from right to left. They are as follows:

<i>Upper Line</i>	<i>Lower Line</i>
1 destroyed	8 frog?
2 rattlesnake	9 deer?
3 tortoise	10 destroyed
4 scorpion	11 destroyed
5 king vulture	12 death
6 marine monster	13 peccary
7 bird	

On the eastern façade of the Monjas at Chichen Itza is a long band of star symbols of exceptional interest (Fig. 3). Out of the twenty-four symbols reproduced in Maudslay's drawings no less than twelve are the diagonal cross which from its frequent occurrence elsewhere must be explained as a symbol of broad meaning. Most of the others show the well known Venus hieroglyph in combination with some animal or bird. Seler has suggested that these combinations refer to the conjunction of Venus with various star groups. Since Venus is seen only among the stars of the ecliptic it follows that these star groups may belong to a zodiac. Accepting Maudslay's drawing as complete the order of the symbols is as follows, reading from left to right:

- | | |
|---------------------------------|----------------------------------|
| 1. Diagonal Cross? (erased) | 7. Diagonal Cross |
| 2. <i>Venus (doubled form?)</i> | 8. <i>Venus and Death's head</i> |
| 3. <i>Venus and Peccary</i> | 9. Diagonal Cross |
| 4. Diagonal Cross | 10. <i>Venus and Bird</i> |
| 5. Moon in sky shield | 11. Diagonal Cross |
| 6. Imix in sky shield | 12. Diagonal Cross |

- | | |
|-------------------------------|-------------------------------|
| 13. Diagonal Cross | 19. <i>Venus and Scorpion</i> |
| 14. <i>Venus</i> | 20. Diagonal Cross |
| 15. Diagonal Cross | 21. <i>Venus and Vulture</i> |
| 16. Diagonal Cross | 22. Diagonal Cross |
| 17. <i>Venus and Tortoise</i> | 23. <i>Venus and Reptile</i> |
| 18. Diagonal Cross | 24. Diagonal Cross |

Now the series given in the Peresianus Codex in connection with the 364-day year may refer, as we have seen, to the continuous conjunctions of the sun with a series of star groups. It is gratifying to find that this series devoted to conjunctions of Venus shows a number of similar figures or symbols. Signs 17, 19, 21, and 23 of the Monjas series seem to be identical with signs 3 to 6 of the Peresianus series and to occur moreover in the same order. Other similar signs include the peccary, the death's head and a bird of uncertain genus (3, 8, and 10 of the Monjas series and 7, 12, and 13 of the Peresianus series). Certain stars in Gemini were called the Tortoise stars according to the Motul dictionary. In the opinion of the writer these two series of pictures furnish the best evidence so far presented that a sort of zodiac had been developed by the Indians of Central America. However, even this falls far short of absolute proof. It must be remembered that no certain calculations referring to sidereal time have yet been discovered in Mexico and Central America. The ritualistic year may have been chosen for the convenient factors of the number 364. It seems especially significant that while the Indians had observed that five synodical revolutions of Venus of 584 days require exactly as many days as eight solar years at 365 days, they do not seem to have discovered the additional fact that thirteen sidereal revolutions of Venus are completed at practically the same time. Förstemann has suggested that the sidereal revolution of Saturn may be recorded in one place but he is probably in error. As for Mercury, Mars, and Jupiter, it is possible that future studies will disclose a knowledge that at present is much in doubt. Observation of the many celestial bands on the ancient Maya monuments has failed to reveal any series of star symbols comparable to the two just presented. On the showing then of these two examples we may be justified in holding open the

question of the zodiac in America so far as the possibility of an independent invention in Central America is concerned. But surely the age-long fallacy of pre-Columbian introduction from Europe should be dismissed.

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NOTES ON EXPLORATIONS OF MARTHA'S VINEYARD

By S. J. GUERNSEY

UNDER the direction of Professor F. W. Putnam I undertook for the Peabody Museum of Harvard University a preliminary archeological survey of the Island of Martha's Vineyard in the month of August, 1912 and 1913. The extent of the field was that portion of the island and of Gay Head within easy walking distance of Menemsha creek (fig. 4); this included the town

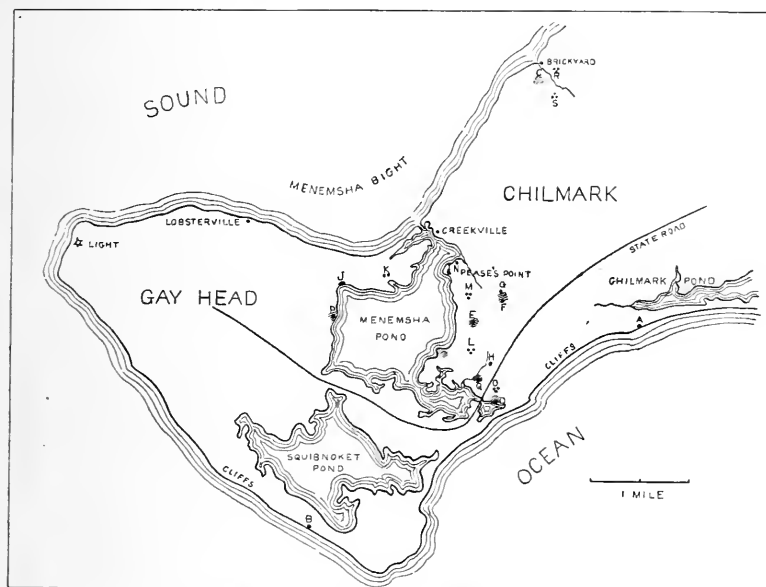


FIG. 4.—Map of western end of Martha's Vineyard.

of Chilmark and the greater part of Gay Head. The cliffs on the south side of the island from Chilmark pond to within one mile of Gay Head light and the shores on the sound side from "Lobsterville" to the "Brickyard" were examined. One day was spent in visiting Watcha and Oyster ponds in West Tisbury, where inter-

esting features were noted which are referred to later. I was unable to explore two promising sites, owing either to the condition of crops, or to the reluctance on the part of owners to grant permission. Results from the work indicate that further investigation might be undertaken with profit as the unworked sites show more surface indications than those examined.

HISTORIC

The first visit to Martha's Vineyard by Europeans of which we have any record, was that of Gosnold in 1602. According to Archer's account his vessel anchored for the night of May twenty-fourth of that year in what is now Menemsha bight.

The island remained in sole possession of the Indians until some time after 1623 when several English families settled on the eastern end. The elder Mayhew having received a grant of the island in 1642 established his colony at what is today Edgartown. At this time, the Indians were estimated to number 3000. After the arrival of the whites, epidemics at various times reduced the Indians to 1500 souls in 1674. The western portion of the island was the last to be taken over by the whites, Gay Head remaining to the present day in possession of the descendants of the aboriginal owners. As late as 1817 some of the Indians on Gay Head lived in wigwams, and three of the five families remaining in Chilmark occupied these primitive habitations.¹

HOUSE AND VILLAGE SITES

On the south shore the only discovery worth noting, was a pit (fig. 5) disclosed by the breaking away of a portion of the cliff at a point nearly opposite the west end of Chilmark pond, which is here separated from the ocean by a narrow strip of land and beach. The cliff at this place is about 30 feet high. The pit (A on map) was $4\frac{1}{2}$ feet deep, $2\frac{3}{4}$ wide, with nearly perpendicular sides. It was closely packed with scallop shells to within eight inches of the

¹ Practically all the historic references to the Indians of this region as well as a bibliography of the subject can be found in "*Notes on the Wampanoag Indians*," by Henry E. Chase. (Smithsonian Report, 1883.)

surface. At the bottom in a layer of coarse charcoal, mixed with the shells were numerous fish, bird, and cracked mammal bones. Just above the charcoal lay the lower jaw of a dog with the bones of the feet directly under it. No other parts of the skeleton were in the pit.

There were also many fragments of pottery (fig. 6), and a notched stone net sinker found in the talus at the foot of the bluff probably came from the pit.

From this point west the cliffs were barren of archeological interest, though at one point, B, where I had been told the cliff was breaking away through an Indian burial place, I saw what may have been a grave, but it had been carefully dug out before my visit. At various points along this shore where the soil was exposed, chipped points of stone, rejects, and many flakes were found.

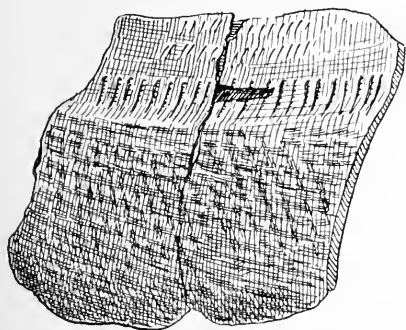


FIG. 6.—Sherd from Pit A.

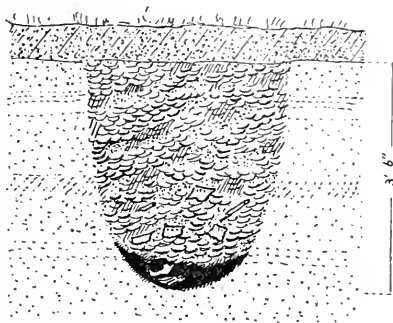


FIG. 5.—Typical shell pit, Pit A.

On the sound side of the island no archeological sites were seen after leaving Menemsha creek until the "Brickyard," C, was reached. Here in a washout near the brook I found several quartzite points and quantities of chips on what may have been a camp or workshop site, the location being well adapted for either.

From the creek west to Gay Head no indications of camps were seen, but it is said by the residents that many stone implements have been picked up near the lighthouse.

Menemsha pond is a shallow tidal pool two miles long by one

wide, the land gradually rising from the shores, except on the north side where a narrow strip of sand dunes and marsh separate it from the sound. This pond and Nashaquitsa pond with which it is connected nearly divide Gay Head from Chilmark. Nashaquitsa is cut off from the ocean by a few rods of beach, Menemsha emptying into the sound through the creek. The east shores of both ponds show almost uninterrupted evidence of aboriginal occupation, in the shell deposits, chipped stone, etc. There are spots where the soil is almost black with decayed débris, and littered about are broken shells, bones, and charcoal which would indicate permanent village sites. One of these is on the Vincent farm, D; another at the spot, E. Here the black soil reaches a depth of over a foot and the bounds are very clearly defined, the surrounding soil being yellow loam mixed with sand. A third site is located at F, near the small brook, and still another at P on the west shore, where I found traces of an ancient cornfield. The hills and rows retain their original shape, some fifty hills being counted. Several of these were opened, showing the soil to be very black and full of broken shells and splintered bones. Its aboriginal origin would seem to be confirmed by the fact that in size and location of the plot there is nothing that would attract a white farmer.

At the site D, on the Vincent farm, I found thirty points and rejects on the surface, and saw at the farmhouse a stone mortar, a pestle, and many more points that had been taken from the spot, and was told that a great many objects had been found and given away. A splendid boiling spring is on this ancient encampment. As the site E was given over to a cornfield and vegetable garden, no digging was attempted, but I picked up from the surface a large grooved stone (pl. I, fig. 16), a fragment of a soapstone pot, and several points, as well as some notched stone net sinkers. Mixed with the soil were many cracked animal bones.

On the site F a portion of the soil had never been cultivated. This is not unusual here as in exposed places if the sod is broken the surface soil blows away leaving barren patches of sand. Here were found what appear to be two house rings plainly defined

(fig. 7). They measure approximately 17 feet in diameter, and are formed by a ridge of earth mixed with the shells and other refuse, two feet wide, and six to seven inches higher than the surrounding surface. The best preserved of the two rings showed a break where the door had evidently been. I did not have permission to explore these sites, but some digging with a trowel in the center of one ring failed to show a fire hole or hearth, though I did not go very deep. The centers of the rings are littered with broken shells, bone, and chips, but the refuse stops abruptly at the outer edge, a proof that the land has not been ploughed.

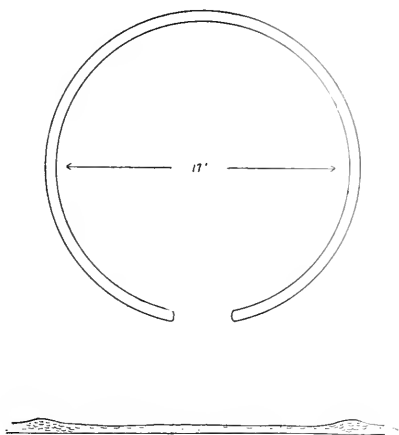


FIG. 7.—Plan of house ring, Site F.

The younger Mayhew briefly describes the houses of the Indians in 1650, as "made with small poles like an arbor covered with mats, and their fire in the midst, over which they leave a place for smoake to go out at."¹

I was fortunate in obtaining the permission of Mr. Ernest Flanders to dig at will in his pasture land on what is known locally as Pease's point, a plot at the eastern end of Menemsha pond, containing roughly forty acres of fairly level land enclosed on two sides by stone walls, the pond forming the other and longest boundary. Along the shore the land rises in an abrupt bank from 15 to 20 feet in height, except for a few rods at the extreme east of the pasture where it meets the pond in a gentle slope. The soil is either sand or gravel covered by a thin layer of loam. A part of the pasture must have been under cultivation at one time as the remains of an ancient cellar and numerous heaps of field stones would testify. At no point did surface indications offer any great inducements to dig. The discovery, however, of a bleached frag-

¹ *Light appearing*, etc. (London, 1651).

ment of human skull some fifty yards back from the shore led to the finding of two graves; search for other bones leading, naturally, to a patch of exposed sand in the side of a bank on the shore where other fragments were found, and a little trenching revealed the graves from which they had been dislodged. (N. on map.)

Grave 1 (fig. 8), which contained a double burial, lay just at the top of the bluff, erosion of which had left the skull of one skeleton covered by only a few inches of sand so that the hoofs of sheep had crushed and scattered parts of it. The second



FIG. 8.—Grave 1, Pease's Point.

skeleton rested in the undisturbed half of the grave extending under the grass land. The first skeleton uncovered was that of an adult male well advanced in years. All the bones except the fragments mentioned were in place and well preserved. The body had evidently been placed in the grave in a reclining position with the head some fifteen inches higher than the feet, the knees drawn up to the chest and the hands placed close against the face.

The second skeleton, that of an adolescent, lay but a few inches from the first and in the same position, the bones being undisturbed

and well preserved, except the skull which had been slightly flattened by the weight of earth above. Both skeletons lay on the right side with the heads west and facing the south. No objects were found in the graves. The cut made above the second skeleton showed a strip of darkened sand probably caused by the decay of bark, mats or skins, placed over the bodies at the time of burial.



FIG. 9.—Grave 2, Pease's Point.

Grave 2 (fig. 9) was twelve feet east of 1 and just at the edge of the grass land. It resembled grave 1 in all essential details, including the band of dark sand above the bones, and held a part of the skeleton of an adult male. The pelvis and the bones of the lower limbs (with the exception of those of the right foot) were missing. What remained of the skeleton lay in natural order with the bones in good condition. No indications were seen, either

on the surface, or in the sand between the foot and other bones of an earlier opening of the grave, but a thorough search for the missing portions of the skeleton was without success.

A few feet south of these burials and midway between them, a small hearth of stones was uncovered just below the loam which is here ten inches deep (pl. II, fig. 2).

In trenching through the level grass land near the hearth, three bowl-shaped pits were encountered, as follows:—

Pit 1. Three feet deep, held blackened earth or sand in which were found bird, fish, and cracked mammal bones, a bone implement (fig. 10), a small object worked from turtle plate (fig. 11) also a few shells and fragments of pottery.

Pit 2. Of the same depth as pit 1, was filled with a compact mass of shells, mixed with which were many fish bones and an occasional splintered mammal bone.

Pit 3. Seven feet east of the hearth was similar to pit 1 both in size and contents. A rude grooveless axe (pl. I, fig. 4) and a grooved sinker (pl. I, fig. 12) were found, and near the bottom a piece of bone, suspected at the time to be human, which has since been identified by Dr. Hooton as a portion of a human left humerus.

Further digging here promising no results, attention was turned to an exposure a few rods east, where a skeleton was said to have been found in 1908, in the hope of recovering which, trenches were run through nearly all the exposed sand and through the grass land until the hard gravel was reached. Two hearths and seven pits were found, but no signs of a burial. The hearths were much larger than the one found near the graves, averaging four feet in diameter, the stones being badly cracked and burned.



FIG. 10.—Bone implement from pit, Site N.

The pits were of the same type as those already described, their contents varying but little, except pit 1 which was $4\frac{1}{2}$ feet deep by 4 feet in diameter, and was filled with sand mixed with powdered charcoal, giving it a hue in sharp contrast to the yellow sand in which it had been dug. Except for a large quartz point found



NET SINKERS AND OTHER ARTIFACTS FROM PITS AND GENERAL DIGGING: 1, PLUM-MET, PIT 3, SITE 2; 2, PERFORATED STONE, PIT 4, SITE 2; 3, PENDANT; 4-6, AXES FROM PITS; 7, FRAGMENT OF PESTLE; 8-13, NOTCHED STONE NET SINKERS; 14-17, GROOVED STONE NET SINKERS

near the bottom of the pit, the black sand was practically free from objects of any nature.

In pit 2, amongst other bones, were portions of the skeleton of a dog, also a small slate pendant.

Pit 3 held bones of deer, birds, and fish, and a large piece of bone, that may have been used as an implement, its shape suggests a pick.

Pit 4 was filled with shells.

Pit 5 contained the usual assortment of bones and shells.

Pit 6 was also a refuse pit from which a few potsherds were secured.

Pit 7 was a shell pit.

A level sandy spot about midway in the pasture's shore line was trenched, four pits being uncovered and two large stone-paved hearths.

A number of points, a notched stone sinker, and a quantity of rejects were found during the excavation of the pits but no objects of especial note.

Three trial holes were sunk in the pasture adjoining Pease's point to the south, each hole disclosing a pit, experience having shown that pits could be located in sandy soil by the fresh appearance of the grass above them, the charcoal and other matter they contain retaining moisture better than the surrounding earth. In one of these pits was a large number of potsherds, showing cord or fabric marking, which from their position seemed to be the remains of a large cooking pot which had been broken while in the pit. A thick crust of carbon adhered to the inner side of the pot as if the contents had burned on. Being unable to communicate with the owner of the pasture, work was discontinued here.

Through the kindness of Mr. Ernest Mayhew, we were allowed partly to explore a small site, Q, on the eastern shore of Nashaquitsa

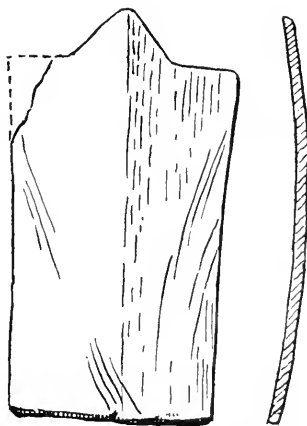


FIG. 11.—Turtle plate object from pit, Site N.

pond, a continuation of Menemsha pond. The site lay at the head of a low marsh, some distance from the shore, rising ground on three sides affording shelter from the north winds, a spring brook along one side supplied excellent water. The surface showed no signs of the prolonged occupation that the black soil noted at other points would indicate, although chips and flakes were plentiful.

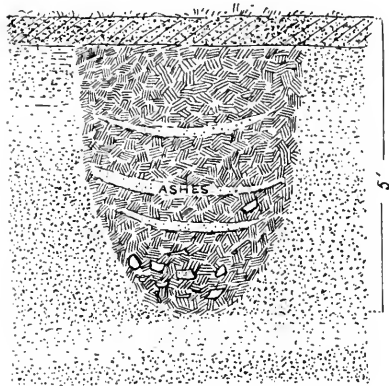


FIG. 12.—Typical refuse pit, Pit 3, Site 2.

A hearth was encountered at the beginning of our first trench and later five pits. The hearth resembled those described and lay just below the loam which is here less than a foot deep.

Pits 1 and 2 held shells and the usual bones.

Pit 3 (fig. 12) contained black greasy soil in which were particles of charcoal and strata of ashes. In excavating this pit there were found a small stone plum-

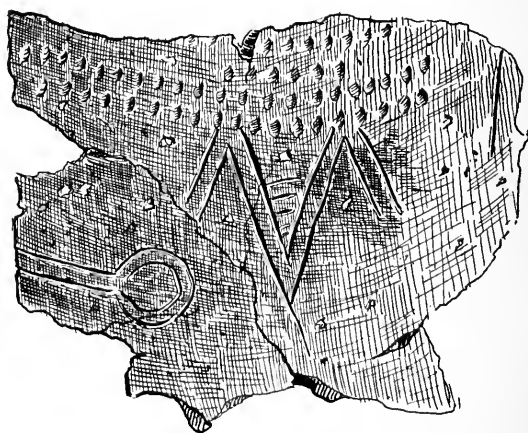


FIG. 13.—Fragment of incised pottery from trench, Site 2.

met (pl. 1, fig. 1), three notched stone sinkers, a bone point and a large variety of bones, including those of dogs, deer, turtles, birds, and fish.

Pit 4, a refuse pit in which shells predominated. In this were found a very

small grooved sinker and a perforated disk-shaped stone (pl. 1, fig. 2). From the trench approaching this pit fragments of a large pot were taken (fig. 13), although badly broken by my assistant in the course of removal, the pieces, when joined together, show an incised design not usually found in this region.

Pit 5 was a shell pit and held no objects worth noting.

A short distance east of the site just described, a house site was found on the bank of the brook. It occupied a small terrace in the bank and was marked by a crescent-shaped ridge of sea snail shells blackened by fire.

Along the east shore fronting the village sites are many pits and outcroppings of shell deposits; from one of the pits I took several large fragments of a pottery vessel (fig. 14), the rim showing markings at intervals along the edge made by pressing the side of a round tool into the soft clay, and a series of impressions made with the end of the tool extended around the pot about one inch below the rim. I also found nearby, a fragment of the rim of a steatite pot having a notched edge.

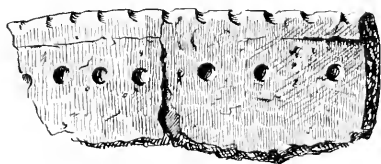


FIG. 14.—Sherd from pit.

In the course of general digging in the sites described a number of points (fig. 15), rejects, worked stones, and fragments of pottery

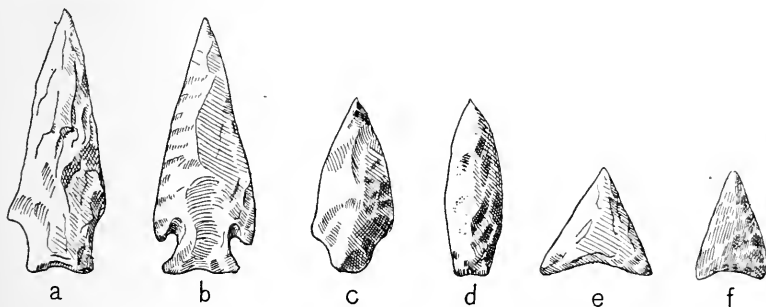


FIG. 15.—Chipped points from pits and general digging.

were found. It seems worth recording that no objects of white men's use or manufacture were found in any of the pits or shell beds, and but one small fragment of European glazed pottery in the general digging.

Oyster pond derives its name from the oysters which are still found there in small quantities and are said to have been abundant in early times. I found but two small heaps of shells and these seemed to be but the remains of a single meal. As none of the land is under cultivation and a great part of it covered by a thick growth of bushes, large deposits may exist.

The most interesting feature of the section is what is said to be the remains of an unfinished canal attempted by the Indians to connect Watcha with Oyster pond (fig. 16). Tradition has it

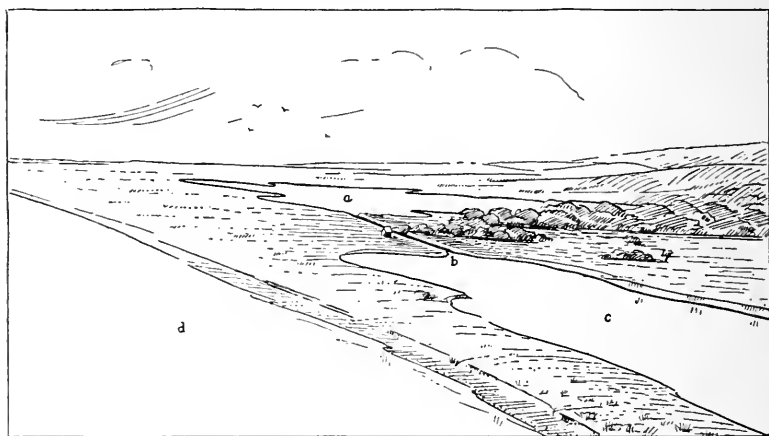


FIG. 16.—Sketch of Canal: a, Watcha pond; b, Canal; c, Oyster pond; d, Ocean.

that both ponds were at one time connected with the ocean and that Watcha pond was cut off by the building up of the beach after an unusual storm. The canal was undertaken to allow the access of fish to Watcha pond through Oyster pond. The shortest distance between the ponds is about 400 feet and at this point there appears a trench 30 feet across and from 6 to 10 feet deep. The earth on either side forms a ridge two or three feet higher than the surrounding surface, as would be the case had the earth removed been thrown or carried to the sides of the trench. The amount of industry required for this undertaking is much greater than we are accustomed to ascribe to New England Indians, but the following historic reference to methods of fishing would seem to give the tradition some weight.

These hospitable natives led them to Great Pond, and showed them their manner of taking fish, which was as follows: A passage was opened from the sea into the Pond and through it the fish entered. There are many coves in this pond, at the entrance of the coves the Indians placed hurdles under water, in a horizontal position, and when the fish had run over them into the coves they went in their canoes, lifted the hurdles upright by means of which they prevented the escape of the fish, and with their spears struck them in the mud.¹

SHELL DEPOSITS

Those examined can be divided into three types: heaps, beds, and pits, the greater number coming under the second head. All were rather shallow and contained besides the shells, fish, bird, and cracked mammal bones, fragments of pottery and chipped stone and traces of fire. The large deposits were made up of the remains of several species of shells as a rule, as were those near the village sites, while the small isolated heaps and pits had only shells of a single species in every case.

Northeast from the house ring at G are several small mounds about $2\frac{1}{2}$ feet high by 19 feet in diameter. These were on land that had not been disturbed. They are quite near each other and suggest by their arrangement the refuse deposits of a group of huts. They are composed of the shells of the scallop (*Pecten irradians*), quahog (*Venus mercenaria*), clam (*Mya arenaria*), and sea snail shells (*Lunatia heros*), mixed with the usual animal bones, and contain many chips and flakes of stone. Another heap, H, is composed entirely of scallop shells.

Two interesting small shell deposits, K, were discovered on the stretch of sand dunes that form the north shore. These had apparently lain undisturbed since their making and had been only recently uncovered by the shifting of the sand. These contained in each case, about two barrels of quahog shells mixed with charcoal. As there is no fresh water near here it is hard to understand why this spot in the sand dunes should have been chosen for a campsite unless perhaps the Indians were harvesting cranberries which grow quite abundantly on the level stretches, and wished

¹ "Description of Duke's County," *Mass. Historical Coll.*, Vol. III, Second Series, p. 81.

to camp near the scene of their operation. No objects or bones of animals were found with the shells.

There are many small deposits near the creek. From one, on which the boathouse of Daniel Look is built, I secured a bone point (fig. 17b).

The largest deposit under the head of beds is at I. At this point, covered by a foot of vegetable mould or loam with no surface indications of its existence, a shell deposit was found which seems to

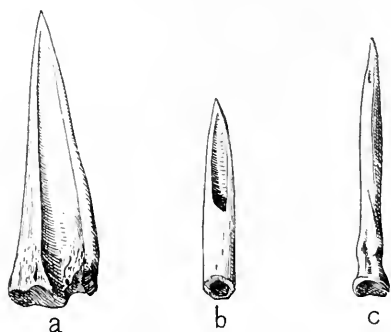


FIG. 17.—Bone implements and points from pits.

be much older than any previously examined. The exact area of the bed was not determined but it was traced in one direction for 100 feet. It runs in depth from 2 to 4 feet, the bottom resting on sand and gravel of a bright rust color, due to the presence near by of quantities of bog iron. The bed is composed of a mass of oyster shells in which digging

was difficult, and although a spade could be forced through the shells owing to their decomposed condition, the compact nature of the deposit made the work very slow. Burned and broken stones and bones of mammals and fish were found throughout the heap, but the only artifacts secured were two broken points and some fragments of a perforated gorget (fig. 18c). Only a very small portion of the bed was examined. Oyster shells were found but seldom in the pits explored and I do not recall finding them at all in the other shell-heaps reported.

Another large shell bed was found on Gay Head, at the point marked J, on the map. It covers about quarter of an acre and is mostly overgrown with bushes. The shells vary in depth from 6 to 18 inches. All the varieties found in the nearby waters are here present, though portions of the heap were made up almost entirely of scallop shells. At one point in our digging we encountered a mass of seaweed, bleached white, but easily recognized as the same weed now

found about the shores of the pond. It appeared to have been a bundle 4 feet long, 3 wide, 3 inches deep. It lay at the bottom

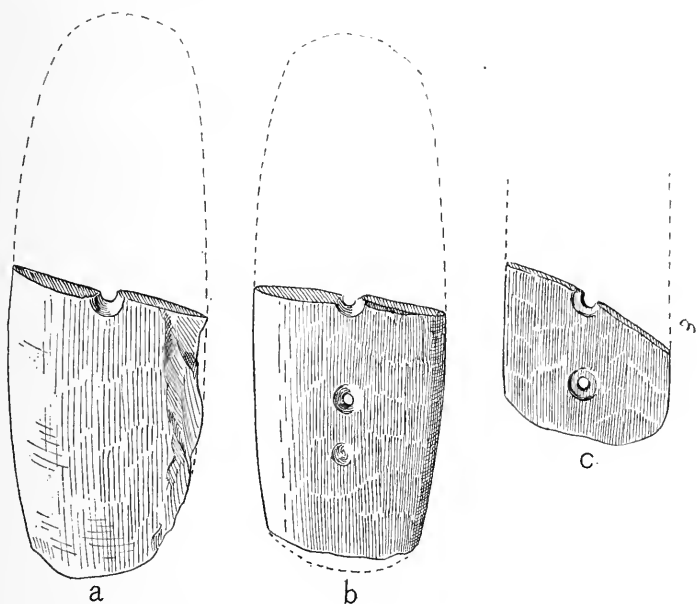


FIG. 18.—Pierced tablets from shell-heaps.

of the deposit and may have been placed there for a bed. Fire-cracked stones were numerous as well as fragments of rudely decorated pottery (fig. 19).

The search for stone and bone implements was poorly rewarded. Three notched stones, what may be part of a small grooved axe, a fragment of worked stone (fig. 18a), several hammerstones and a few rejects were all that were found in the portion explored.

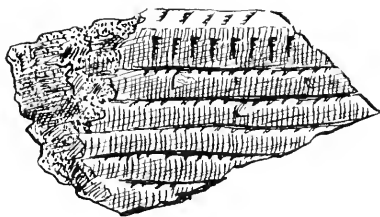


FIG. 19.—Sherd from shell-heap.

BURIAL PLACES

Three burial places occur near the ponds, one occupies a small knoll at M, the second lies about quarter of a mile south at L beside

a disused road that crosses the pasture lands to a fording place at the narrows between the ponds, and a third at O on the Vincent farm a few rods south of the state road. The graves are marked by small rough field stones of various shapes and the plots have long been known to the natives as ancient Indian burial places, the owners of the land on which they are located respecting them as such, having refrained from ploughing into or otherwise disturbing them. The arrangement of the stones is so irregular and they are so like what one would expect to encounter in pasture land, that they do not appear to be cemeteries even after being pointed out as such. The plot at M is the smaller of the three and as indicated by the stones may contain ten or fifteen graves. The burial ground at N covers an area about the size of a town lot. There are here about fifty stones large and small. Plot O (plate II, fig. 1) on the Vincent farm is next in size and has thirty stones. Thinking that these stones possibly mark later Christian interments while the place may have been also used at an earlier time for Indian burials, and wishing to make sure that they had been used at all, I obtained permission to dig in the plot marked N on the map.

Not wishing to disturb the cemetery needlessly, if it proved to be one, I started a trench at the southeast corner just outside what seemed to be the bounds, and worked towards what appeared to be a headstone. Here at the depth of $2\frac{1}{2}$ feet were found rusty wrought iron nails, and 16 inches deeper, parts of a skeleton. The bones were badly decomposed but enough remained to show the body had been buried in a horizontal position. The nails found are probably all that is left of the coffin. The stone I had supposed to mark the head of the grave lay directly over the middle of the skeleton so in this case it seemed to have been placed with little regard to the customary method of marking modern graves. Restoring the ground to its former condition as nearly as possible, a trench was started on the opposite corner just outside the plot. Here at the depth of 18 inches the bones of a young person were uncovered. The skeleton rested on the right side with the knees drawn up and the hands placed before the face. The skull had been crushed by the weight of earth or by passing wheels, other-



1. CEMETERY O. SHOWING ROUGH FIELD-STONES MARKING GRAVES
2. STONE HEARTH NEAR GRAVES, PEASE'S POINT

wise the bones were in perfect condition. There were two stones within a few feet of this grave but in no way marking it. No objects were found with the bones. This grave, which was aboriginal without doubt, supports my theory that burials had taken place here prior to those marked by the stones. I was unable to continue the investigation as the owner of the land objected to further digging and permission could not be secured to explore the other plots mentioned.

Two small cemeteries near the Brickyard were visited and photographed. They are of the same type as those already described, the graves being marked by rough field stones set without any apparent order. No exploration of these sites was attempted. The plot marked R on the map had been disturbed and in the filling above the grave were fragments of wrought-iron nails so that there is little doubt that some of the graves contain Christian burials. From the location and general appearance of the plot at S there is reason to believe that digging would reveal aboriginal as well as Christian burials, as was the case at N.

In connection with the burial places, it is said that on Gay Head there are many single graves marked by stones, about which fires had been built to drive away evil spirits that might disturb the dead. I saw stones about the size of those that marked the graves already described which showed traces of fire, but as I had no opportunity to investigate by digging, I am not sure they mark graves. These graves, if they are such, are supposed to antedate the Christian burials.

PEABODY MUSEUM,
CAMBRIDGE, MASS.

NOTES ON SKELETAL REMAINS FROM MARTHA'S VINEYARD

By E. A. HOOTON

THE skeletal material forming the subject of this report comprises the remains of three individuals, two old men and a boy. The men were muscular individuals, with long heads and well-developed brow ridges. The cranial type is one frequently met with in New England Indians, especially in the Maine shell heaps. The boy was very large for his age. His skull is broader than any other New England Indian cranium in the Peabody Museum collection. The cranial index is 81.5, but with the development of brow ridges and strengthening of the muscular attachments of the occiput, at maturity, he would probably have had a somewhat lower index. He represents simply an individual variation of the type.

SKELETON NO. I (59488)

Cranium. This is the skull (pls. III and IV) of an aged male. It exhibits no deformation, and has been preserved entire.

The frontal region is broad and moderately retreating. There is a slight median eminence. The sagittal region is rather elevated and the sagittal suture lies in a slight furrow. The parietal bosses are well developed. About 3 cm. below bregma and 1 cm. behind the coronal suture on the left parietal is an old lesion of small size. The temporal region is rather compressed and the wings of the sphenoid are deeply furrowed. The occipital region is flat at lambda and below moderately convex with well-developed muscular attachments. The mastoids are large.

The serration of the sutures is simple. The coronal is completely obliterated in the pterion regions, and here and there along its entire length. In the sagittal and lambdoid sutures obliteration



FRONT AND BACK VIEW OF SKULL NO. 59488



SIDE AND TOP VIEW OF SKULL NO. 59488

has begun. The pterions are in broad H, and there is a large epipteric bone on the right side.

The supra-orbital ridges are well developed medially, and laterally the superior orbital margins are considerably thickened. The nasal depression is slight; the bridge of the nose high and broad. The ends of the nasal bones (nasalia) are depressed and irregular. The nasal aperture is narrow, with a well-developed spine and dull lower borders. The orbits are low and broad, with thickened margins, and there are traces of the infra-orbital suture. The sub-orbital fossae are but slightly marked. The malars are large, and the right side has a very large processus marginalis.

Most of the teeth in the maxilla were lost in life, and the alveolar arcade had undergone considerable absorption. In the mandible the right median incisor and canine remain, and are much worn. The palate was probably broad U-shaped.

The base of the skull shows deep glenoid fossae with a slight post glenoid process. The styloids have been broken away but were evidently small. The depression of the petrous portions of the temporal bone is slight. The foramen magnum is large and asymmetrical, with the edges much thickened. The condyles show arthritic flattening.

The mandible is large, but had undergone a good deal of senile reduction. The ascending rami are broad and the sigmoid notch is deep. There is a well-developed median chin. The condyles are flattened.

Long Bones, etc. These include the bones of the upper extremity, cervical and dorsal vertebrae, and foot bones.

Humeri. These are large and muscular bones. Just below the head of the right humerus there has been a necrosis involving the anterior and medial side of the diaphysis and the medullary cavity. The cancellous tissue has been destroyed and the whole presents the appearance of an infection due to a tumor.

Scapulae. Fragmentary. Large and muscular with high acromion processes.

Vertebrae. These present extensive marginal exostoses due to arthritis.

Foot Bones. Bones of the right foot only. The astragalus is high, and there are extensive supplementary articular facets on the medial side of the neck, showing that the man was in the habit of squatting. Viewed from above the external malleolar facet shows unusually great obliquity. The calcaneum is high with a well-developed sustentaculum.

Estimated Height. On the basis of Pearson's formula (h), the height of this man, based on the length of the left humerus and radius, was about 162 cm. Probably, however, if the bones of the lower extremity could be taken into consideration, the estimated stature would be considerably augmented.

SKELETON NO. 2 (59489)

Cranium. The remains of the cranium include the frontal bone, the temporal bones, the face and the mandible.

The frontal region is broad and moderately retreating. The sutures of the cranial vault were probably largely obliterated. The temporal bones are massive and the mastoids large. There are three large retro-mastoid foramina and two small ones on the right side, on the left side there are two large foramina.

Medially the supra-orbital ridges are enormously developed. The lateral parts of the brow ridges are also large, and are separated from the median eminence by deep grooves terminating in the supra-orbital notches. The nasal depression was slight. The nasal bones are missing. The bridge of the nose was of moderate height and width. The nasal aperture is of medium width with a well-developed spine and dull lower borders. The orbits are of medium height. The malars are large and the zygomae thick and heavy. The sub-orbital fossae are of average depth. In the maxilla most of the teeth were lost during life, and the alveolar arcade largely absorbed. The only tooth remaining in the maxilla is the left posterior premolar which is much worn. The palate was U-shaped. Dental abscesses have affected the alveolar border in the region of the right canine and the left third molar. In the mandible the incisors, canines, premolars, and right third molars are *in situ*. All these teeth are much worn down; the right pre-

molars exhibit caries, and inflammations have affected the arcade about the roots of the first and second right molars.

The glenoid fossae are deep and there is a well-developed post-glenoid process. The *Tuber Culum articulare* is unusually large. The styloids which are broken away, were very large. A fragment of the occipital bone, including the basilar process and the left side of the foramen magnum, shows that there was no post-condyloid foramen on the left side. The occipital condyle is arthritically flattened.

The mandible is very large with a well-developed median mental process, broad rami, and a deep sigmoid notch. The condyles are somewhat flattened and slope from without downward and inward.

Humeri. These are large with very well-developed muscular attachments. The inferior articular surfaces show arthritic osteophytes.

Radii and Ulnae. The bones of the forearm give evidence of a great muscular development.

Vertebrae. Most of the vertebrae have marginal exostoses.

Pelvis. The pelvis is distinctly male. The sacro-sciatic notch is narrow; the prae-auricular sulcus is slightly developed. The sacrum is long, narrow, and straight.

Femora. The femora are large and muscular with well-developed pilasters. On each there is a pronounced crista hypotrochanterica, and platymeria is very marked. The head and neck in both instances show a most unusual torsion, which amounts to 47° in the right femur and 48° in the left. The lower two thirds of the diaphysis of the left femur shows a pathological deposition of bony tissue.¹ The condyles of both femurs are flat, and the shafts present a greater degree of curvature than is usual.

Tibiae. These are very platycnemic and have extensive supernumerary articular facets on the anterior lip of the lower articular surface.

Foot Bones. The bones of the feet are large. The calcaneum has an excessively developed sustentaculum tali; the astragalus has "squatting facets" on the neck.

¹ Dr. Arthur Keith is inclined to diagnose this condition as syphilitic.

CRANIAL MEASUREMENTS

Sex	No. 59488 ♂	No. 59489 ♂	No. 59490 ♂
Approximate age.	Past middle life	Past middle life	12-14 yrs.
Deformation.	None	None	None
Glabello-Occipital length.	187	—	179
Maximum width.	137	—	146
Basion-Bregma height.	141	—	—
Auricular height.	121	—	112
Minimum frontal diameter.	99	99	—
Diameter bi-zygomatic.	(c.) 138	—	—
Min. breadth ascending ramus.	39	42	32
Bigonial diameter.	(c.) 96	(c.) 100	100
Mean angle ascending rami.	117°	118°	127°
Height of symphysis.	(c.) 38	(c.) 35	30
Bi-condylar width.	(c.) 134	—	(c.) 122
Condylar-symphysial length.	109	(c.) 120	106
Orbits (right)			
height.	32	—	—
breadth.	43	—	—
Nasal Aperture			
height.	50	—	—
breadth.	23	—	21. "
Basion-Nasion.	110	—	—
Palate			
external length.	—	—	53
external breadth.	—	—	68
Maximum circumference (above brow ridges).	521	—	—
Arc			
Nasion-Opisthion.	383	—	(c.) 373
vertical transverse.	318	—	—
Indices			
cranial.	73. 2	—	81. 5
height-length.	75. 4	—	—
height-breadth.	102. 9	—	—
mean orbital.	76. 3	—	—
nasal.	46	—	—
external palatal.	—	—	128. 3
cranial capacity.	1,480 c.c.	—	—

Estimated Height. On the basis of Pearson's formula (f), the height of this man was about 175 cm.

SKELETON No. 3 (59490)

Cranium. The cranial vault is incomplete and somewhat warped; the skull base is missing; the facial skeleton is fragmentary but the palate with the teeth *in situ*, and the mandible, are preserved (pl. v). The subject was a boy thirteen or fourteen years old at the time of his death. The second molars had just erupted and the epiphyses of the long bones are separate from the shafts.

The frontal region of the skull is broad and bulging. The bosses



SIDE AND TOP VIEW OF SKULL NO. 59490

are prominent. The sagittal region is slightly elevated, very broad, and with the parietal tuberosities well marked. The temporal region is full. The occipital region is moderately convex, and the muscular attachments are, as yet, little developed. The serration of the sutures is very simple and they are all open. There are no Wormian bones. The pterions are in broad H; there are neither parietal foramina nor retro-mastoid foramina; the mastoids are little developed.

The supra-orbital ridges are undeveloped, but the glabella is prominent. The nasal depression is very slight and the bridge of the nose seems to have been rather broad and low. The nasal aperture was broad with a well-developed spine and dull lower borders.

	No. 59488		No. 59489		No. 59490	
	R.	L.	R.	L.	R.	L.
FEMUR						
Length, bi-condylar.....	—	—	482	494	415 (without head)	412
Length, maximum.....	—	—	489	499	421	420
Diameter of head, maximum.....	—	—	50	50	—	—
Sub-trochanteric diam.,						
antero-posterior.....	—	—	27	25	23	22
lateral.....	—	—	38	40	30	31
Middle shaft diam.,						
antero-posterior.....	—	—	32	—	28	28
lateral.....	—	—	27	—	24	24
Angle of torsion.....	—	—	47°	48°	45°	32°
TIBIA						
Length maximum (minus spine).....	—	—	391	—	349	—
Middle diameter,						
antero-posterior.....	—	—	37	37	29	30
lateral.....	—	—	22	23	22	21
Nutritive foramen diam.,						
antero-posterior.....	—	—	44	40	34	33
lateral.....	—	—	26	24	23	23
FIBULA						
Length maximum.....	—	—	—	376	—	—
HUMERUS						
Length maximum.....	323	322	—	341	—	—
Max. diam. articular head.....	45	46	—	47	—	—
RADIUS						
Length maximum.....	256	254	262	266	—	—
ULNA						
Length maximum.....	279	—	—	286	—	—
INDICES						
Femur						
Middle index.....	—	—	118.5	—	116.6	116.6
Index of platymeria.....	—	—	71.0	62.5	76.6	70.9
Tibia						
Middle.....	—	—	59.4	62.1	75.8	70.0
Index of platycnemia.....	—	—	59.0	60.0	67.6	69.7

The mandible is infantile, but large. The third molars had not yet erupted, but the median incisors and first molars show some wear. The wear on the median incisors slants from behind downward and forward, showing that the bite was not "edge to edge." The quality of the teeth is excellent. There are four cusps on the upper molars and five on the lower. The incisors and canines show the typical shovel form which Dr. Aleš Hrdlička has demonstrated to be a characteristic of the American race. There is a slight crowding of the lower incisors. The palate is parabolic in form and of medium height.

The glenoid fossae are deep and there is a small dehiscence in the floor of the auditory meatus on each side.

Other Skeletal Parts. These are all of good size with the muscular attachments as yet little developed. The femora show a developing pilaster, incipient platymeria and flattened condyles. The torsion of the head and neck, as in the preceding subject, is great. It amounts to 45° in the right femur and 32° in the left. The occurrence of such an unusual amount of torsion of the femoral head and neck in both of these skeletons, would indicate that this character is possibly something more than an individual variation. Pronounced positive torsion of the femoral neck and head is often observed in the American Indians, but such extreme torsion is unusual. Examination of a number of femora belonging to New England Indians does not seem to show that this character is any more pronounced in remains from this region than in those coming from other parts of the country. No entirely satisfactory theory explaining the causes of femoral torsion has been advanced.

Estimated Height. On the basis of Pearson's formula c , the height of this boy, based on the length of the right tibia, including both epiphyses, was about 162 cm. This would make him very large for his age. According to Boas the average stature of 15 year old boys of the larger North American Indian stocks is 158, 0 cm. and of white boys (Worcester) 162, 0 cm. On the evidence of the teeth and long bones this boy was in all probability younger than 15 years.

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HENRI BEUCHAT

HENRI BEUCHAT

By C. M. BARBEAU

THE forlorn hope that some of the lost members of the ill-fated Canadian Arctic Expedition might reappear has long been abandoned and it is with regret that we here record the presumed death of Henri Beuchat, one of the two ethnologists of the expedition.

Although still a young man, whose career lay more in the future than in the past, M. Beuchat had deservedly won a high reputation as an anthropologist. In him American archeology and ethnology lose one of their most brilliant European exponents. We are indebted to Madame M. Hollebecque, of Paris (France), for much of the following biographical material.

If M. Beuchat's personality and achievements were to be characterized in a few words, we would describe him as a modest and most brilliant self-made man of science, who by sheer determination and talent acquired a vast and critical knowledge of many subjects and achieved success in the face of adverse circumstances.

Born in Paris, in 1878, his school education came to a premature end when he was only thirteen years of age. His naïve but keen interest in books then determined his choice of a calling; and he became a compositor in a Paris printing office. At the age of eighteen the death of his father and his responsibility for the welfare of his family induced him to accept the more remunerative position of accountant in a business concern. His military training was next undergone in his twenty-second year. Bent as he was to become a man of learning, these years of early assiduous manual labor, although somewhat impairing his health, were not without benefit for him. All his spare moments were devoted to his many-sided hobby: books, museums, and lectures. In the printing office he developed the technical qualities of neatness and precision, and his skill as a draughtsman, which enabled him later to provide his

own manuscripts or publications with maps and engravings from his own hand. On the very subject of the printer's types his curious and searching mind soon began to speculate. He thus undertook a minute study of the history of printing and writing generally. Other symbols and methods of writing also appealed to the young typographer; and his greatest enjoyment, when he was a mere adolescent, consisted in deciphering hieroglyphic, cuneiform, Syriac and Nagari characters and alphabets, and compiling such data in notebooks. Through the subsequent changes in his life he remained interested in this study, which later embraced that of the Mexican and Central American systems. In later years he was still gathering materials and fondly elaborating a plan for a forthcoming work on 'writing' (*L'Ecriture*). This hobby led him into the study of living languages. While he was giving French lessons to Danish, Swedish, Norwegian and other students in Paris, he was repaid by lessons in their own languages. From this starting point his curiosity and power of assimilation embraced many other languages, including those of Central and South American tribes.

A certain modification in his lines of interest followed his passage from the printing to the business offices. The business drudgery gave life, in his imagination, to figures, formulae, and calculation. After he had mastered the elements of mathematics, his attention gradually turned to astronomy and chemistry. It is, indeed, astonishing that a self-made scholar, even when gifted with unsurpassed memory and judgment, should not have lost his bearings in the midst of such diversified subjects. Where others are usually submerged, however, he was building and storing for the future. Mere facts were interesting to him only as related to others; and instead of being stored pell-mell in his brain they were assimilated and classified. This explains how he developed into a type of scientist that has well nigh disappeared now, and won distinction in fields of science quite divorced from his own anthropological research. Thus, in 1913, he won the '*Prix des Dames*' in astronomy, for his many services since 1894 in attending and directing the weekly meetings of the Société Astronomique de Paris. And, as a pastime,

he was annotating and correcting Mendeleyeff's data on chemistry, and preparing a scientific novel entitled *Les Cristaux*, in which he was embodying several of his philosophic ideas and hypotheses.

Notwithstanding the exclusiveness of the Paris academic and scientific circles, the reputation of young Beuchat began to spread in many quarters, and won him the favors and protection of many noted personalities, notably the Duc de Loubat, la générale Bocher, M. le Souëf, and Léon de Rosny. In 1902 he became *élève titulaire* at the Section des Hautes Etudes, La Sorbonne; and he assimilated in his own way the anthropological views and methods of the Durkheim school, especially under the guidance of his esteemed masters and friends, MM. Mauss, Hubert, and others. Lack of space here forbids the detailed account of his arduous and trying career as anthropologist in Paris. While he was stubbornly pursuing his own researches on American archeology and ethnology, his energy was often taxed to the utmost by his professional duties and many tasks of secondary importance. In 1902-3 he became the secretary-treasurer of *La Revue des Etudes Américaines*, and was entrusted by M. le Souëf with the preparation of a lengthy illustrated manuscript on Mexican art. After receiving a diploma at the Ecole du Louvre, he was appointed secretary of *La Revue de Paris*. The university ruts and regulations barring him from a university function, for which he was otherwise qualified, forced him to accept an insufficiently remunerative post in the Fine Arts Department of the French Government. In this capacity he had to attend to exacting drudgery in connection with the administration and classification of the ancient monuments of France. Other irksome tasks also consumed much of his time, such as the preparation of maps showing the distribution of racial and cultural elements in America for the Musée de Saint-Germain-en-Laye, the restoration of the Marquesas islands hall in the Louvre, and the translation, in 1912, of Nordenskiöld's work on the Gran Chaco Indians (*La vie des Indiens au Grand Chaco*, Paris, Delagrave).

Although only at the beginning of his productive career as an Americanist, his versatility, clarity of ideas, and creative talent are shown in his essays, reviews, and works, the principal of which

is the remarkable and unique *Manuel d'Archéologie Américaine* (Paris, Picard, XLI, 773 pp., 1913), the only ambitious classificatory work on American archeology in its wider sense yet attempted.

The bibliography of his publications is the following:—

In the *Revue des Etudes Américaines* (1902): 'Notice sur quelques manuscrits mexicains de la Bibliothèque Nationale de Paris'; and 'Notice analytique sur les travaux de Lord Kingsborough' on Mexican antiquities. (1903): 'Les peuples Chahta-Maskokis' (Jan.); 'Quelques traditions des Eskimos de l'Alaska' (April); 'Quelques légendes des Eskimos de la terre de Baffin' (July); 'Le mythe de Sedna chez les Eskimos du centre' (Nov.).

In *L'année Sociologique* (1904-5) he collaborated with M. Mauss in an important study on the social morphology of the Eskimo, entitled 'Essai sur les variations saisonnières des Eskimos (pp. 40-132).

To *L'Anthropologie* he contributed a number of reviews (1905-13) on the works of W J McGee, Mauss, Steensby, E. de Jonghe, Nuttall, Speck, Berloni, and others.

In collaboration with Dr. P. Rivet he published several linguistic papers, namely: 1, 'Contribution à l'étude des langues Colorado et Cayapa (Equateur)' (in *Journal de la Société des Américanistes de Paris*, t. IV, 1907); 2, 'La famille linguistique Záparo' (*ibid.*, t. IV, 1908, fasc. 2); 3, 'La langue Jíbaro ou Šiwora' (in *Anthropos*, IV, 1909; V, 1910); 4, 'Affinités des langues indigènes du sud de la Colombie et du nord de l'Equateur' (Paniquita, Coconuco et Barbacoa) (in *Muséon*, 1910); 5, 'La famille Betoya ou Tucano' (in *Mémoires de la Société de Linguistique de Paris*, t. XVII, 1911).

In the *Revue d'Archéologie* (1911) he published a study on the present knowledge of the 'Manuscrits indigènes de l'ancien Mexique,' which he later completed in his article on 'L'Ecriture Maya' (in *Journal de la Société des Américanistes de Paris* (1913)).

In 1911 he collaborated with Mme. M. Hollebecque in the preparation of a small handbook on the origin and nature of religious phenomena, *Les Religions, Etude historique et sociologique du phénomène religieux* (Paris, M. Rivière).

The premature end of his career leaves many important studies

and works unfinished. More than 5000 slips, representing many years of work, had been compiled, prepared, and sorted, and the plan arranged for a voluminous sequel to his *Manuel d'Archéologie Américaine*, entitled *Peuplades Sauvages de l'Amérique*. In collaboration with MM. Lahy, Chaillié, and Mme. Hollebecque, he was also compiling materials for an exhaustive study of the *Mythes de la Création*, in the various parts of the world.

When, in the spring of 1913, he was invited to join the Canadian Arctic Expedition, his decision was instantaneous. We are told by his mother that this "was the first great joy of his life." Fond of seeing things with his own eyes, he wanted to live among the peoples with whom his imagination had dwelt for so long. The fragmentary evidence of books and museums was no longer sufficient; and he had long felt the call of living realities. Some of his La Sorbonne friends, in fact, wished, in 1909, that an expedition might be organized enabling him to complete in the field his Eskimo studies. Fate, however, seemed to be against him, and he many times despaired of ever getting away from libraries, museums, and the exacting trivialities of his Parisian environment. The opportunity of joining the Canadian Arctic Expedition, although practically devoid of any material compensation, appeared to him as a unique chance of emancipation. His mother, to the support and love of whom he had pledged his life, was glad for him, although heart-broken. In a recent letter she wrote: ". . . Life had never yielded him the happiness which he deserved; and I was hoping for his future." When he joined the Anthropological Division of the Geological Survey of Canada, his new friends enjoyed the charm of his companionship and brilliant conversation. Everyone was impressed with the extent and soundness of his science. Jenness, his companion ethnologist, wrote from Nome (Alaska) ". . . Beuchat is an absolute encyclopedia of knowledge. He has already been christened 'professor.' And he is a most delightful companion" Jenness, an Oxford University graduate, did not seem to suspect that his highly deserved eulogy was addressed to a humble Paris typographer, accountant, secretary, proof-reader, and government employee, who in spite of all burdens

and odds had achieved learning. His friend Chaillié, a French scientist, wrote of him: "His quality of self-made man (*autodidacte*) was what we liked him for. Besides his reading and prodigious memory, he had imbibed much experience in varied stations in life, whence his emotional and intellectual faculties had derived precious gifts"

But where he was sure to find the realization of his dreams and the enjoyment of a world of actualities, he was unfortunate enough to meet, at the age of thirty-five, the fate of so many polar explorers. All those who knew him mourn today the loss of a friend and Americanist in whom they had placed the most sanguine hopes. When the news of his presumed death was last summer broken to his mother, it was feared that she could not withstand the shock. She showed herself, however, as heroic as many had known her to be and she finally said: "I have lost everything. But I won't give up life yet. Our epoch of gigantic struggles is worth living through." And more recently she wrote: "I feel in my heart that my sorrow would be less bitter if I were told that the loss of my only son has been a sacrifice to science."

ANTHROPOLOGICAL DIVISION,

GEOLOGICAL SURVEY, OTTAWA

BOOK REVIEWS

METHODS AND PRINCIPLES

The Antiquity of Man. ARTHUR KEITH, M.D., LL.D., F.R.S., Hunterian Professor, Royal College of Surgeons of England. Philadelphia: J. B. Lippincott Company, 1915. Pp. xx, 519, 189 illustrations.

On account of the war this work did not appear until one year after the proofs were corrected. In it the problem of man's antiquity is approached from the point of view of the anatomist.

Dr. Keith's initial chapter deals with the Neolithic race that built certain megalithic monuments of Kent. This race is long-headed and short of stature, not very different from a modern group of English people of the industrial class. The most pronounced differences are to be seen in the teeth and the lower limbs. This type characterizes the later Neolithic period in England, and is found in the long barrows. It is a variant of the earliest Neolithic race in England represented by the Trent or Muskham skull, called by Huxley the "river-bed type." It is also found in Spain, France, Switzerland, North Germany, and Scandinavia; likewise in Egypt of the Sixth Dynasty, which is contemporaneous with the Neolithic of England.

According to the author, the early Neolithic period corresponds to the period of the submerged forests. At that time the estuary of the Thames was far out in the North Sea, just west of the Dogger Bank. Since then there has been a filling of the valley due to submergence. At Tilbury below London in 1883 the old Neolithic valley bottom was met with at a depth of 32 feet below the level of the marsh. Some three feet deeper a human skeleton was found. It is supposed to represent the people of the submerged-forest area, and to have been deposited there anywhere from seven to twelve thousand years ago. The Tilbury skull is also of the river-bed type.

From the river-bed type the author passes to a consideration of the later Paleolithic population of Europe, as represented by the remains from Engis, Crô-Magnon, Grotte des Enfants, Brünn, and Combe-Capelle. In his opinion the two Grimaldi individuals from the Grotte des Enfants belong to an aberrant Crô-Magnon form, rather than to a different race. Both are of Aurignacian age. During the later Paleolithic period Europe

was inhabited by tall and rather distinct races having long, narrow heads, and brains that were capable of conceiving and appreciating works of genuine artistic merit.

Going back a step farther, we come to the Mousterian epoch, that of the Neanderthal race, which the author synchronizes with the 50-foot terrace of the Thames valley (known on the Continent as the low terrace). *Homo neandertalensis* was a type quite distinct from the men of Crô-Magnon and Combe-Capelle. Its skeletal remains have been found from Gibraltar in the south to the Neander valley in the north, and from the Island of Jersey to Krapina in Croatia.

Of pre-Mousterian races the author has much to say. Traces of them are found in the 100-foot terrace of the lower Thames valley. The skull found by Mr. W. M. Newton at Dartford is supposed to be of Acheulian age; while the skeleton found in the gravel pit at Galley hill is assigned to the still more remote Chellean epoch. The skeleton recently found under a layer of chalky boulder clay at Ipswich is accepted as authentic, and consequently referred to a pre-Chellean stage, although anatomically it differs little from a Neolithic or even a modern skeleton. That it should be wholly different in type and at the same time be nearly as old as *Homo heidelbergensis* interposes in the mind of Dr. Keith no serious difficulties. Future discoveries may prove him to be right. The more conservative thinkers, however, would not endeavor to anticipate the discoveries.

Much space is rightly reserved for a consideration of the important find recently made at Piltdown Common, Sussex. As a "student of the human body," Dr. Keith is of the opinion that future discoveries will prove that the remains of *Eoanthropus dawsoni* represent the first trace yet found of a Pliocene form of Man, and also that Dr. Smith Woodward is justified in creating for it a new genus of the family Hominidae. In other words, he believes the canine tooth, lower jaw, and skull all belong to the same genus; thus differing from Dr. Gerrit S. Miller of the United States National Museum, who would refer the canine tooth and lower jaw to a fossil chimpanzee, *Pan vetus*, sp. nov.

The author's conclusions are given a final apt and brief expression in the form of a combined anthropoid and human genealogical tree, which is put forth as a working hypothesis. Much of his personality has gone into the pages of this interesting book, which should be widely read.

GEORGE GRANT MACCURDY

The Loom and Spindle, Past, Present and Future. LUTHER HOOPER.
(Smithsonian Report for 1914, pp. 629-678.) Washington, 1915.

[Canton Lectures delivered before the Royal Society of Arts, London, Feb. 26, March 4 and 11, 1912. Reprinted by permission from the Journal of the Royal Society of Arts, Sept. 6, 13, 20, 1912.]

In a recent monograph, Mr. Luther Hooper treats in a most interesting manner the development of the modern loom and spinning processes. Starting from the earliest examples, he traces the mechanical evolution in a way that leaves little to be discussed. A portion of this paper was contained in his excellent work entitled *Hand Loom Weaving*, but much new matter has been added. On the primitive forms of textiles, at least their technical problems, there is too little literature. It is rarely indeed that a writer appears possessing the necessary mechanical knowledge, coupled with an interest in the problems of ethnology and archeology.

On page 632 is an illustration of a loom intended to convey rather the essential movements of weaving than to represent any known type. Perhaps the statement that sticks separating the warps are essential to the formation of a workable warp may not be quite exact since some very rudimentary looms exist in which these crosses are absent. But it is certainly true that wherever great numbers of warps are used, such devices are indispensable.

Deviating for the moment from the sequence of Mr. Hooper's article, attention may be drawn to the illustrations of Greek looms on page 636. This loom may be termed the weighted warp type. Besides the places mentioned in the text this class of loom is used among the Chilkat Indians of Alaska. It may be mentioned that the feature of this loom was that it did not allow for the use of the heald rods in the shedding of warps and for this reason could not develop to such a degree as the type about to be considered.

The loom of Calabar illustrated on page 647, fig. 28, is typical of the two-barred heald rod loom which is almost universal. This form of loom, with only minor differences, was used by the natives of Asia and Egypt, and appears in every cotton weaving region except among the Chilkat. Fig. 13, page 641, gives a very clear idea of the purpose of the heald rod. It is, however, a single heald capable only of raising one set of warps. On such a loom the alternate sheds were formed with the aid of the weave sword. Fig. 28, however, has two healds operating alternate sheds and for plain weaving no other shedding devices were required. In weaving with this type of loom it is obvious that one hand

operated the healds while the weft bobbin was inserted with the other. If, however, cords were attached to these healds in such a way as to permit the formation of sheds by a simple pressure of the foot, both hands would be left free for weaving. This would naturally greatly increase the production of the loom. In fig. 29, page 647, the simplest form of such a loom is illustrated. This type of loom is the forerunner of every power loom in our mills today. The great change effected by this simple invention entitles it to consideration as one of the most important in textile history. In the revolutionary effects it produced, it can be compared only with the fly shuttle of Kay, one having as powerful an influence on the management of the warps as the latter on the insertion of weft.

This foot treadle loom was introduced by the Spaniards into Mexico very soon after the Conquest. Perhaps a form such as depicted in fig. 33, page 650, was the one introduced. Apparently the Mexican weavers quickly recognized the improvement in point of output this loom had over their simpler form, and this type of loom unquestionably modified the technique of weaving to a great degree. Mr. Hooper, starting from this simple form, carries the reader easily along through the intricate mechanical additions of the Middle Ages to the culminating achievements of Jacquard and even suggests the future form of the loom. But this part of the paper has a more direct appeal to the textile student than to the ethnologist.

Returning to page 633, a brief description of the essential movements of hand spinning is given. Here again the purpose has been to outline the basic principle rather than describe the craft of any particular people. This is of great value as permitting an observer to comprehend the meaning of the different methods which vary with race, nature of fibers, and other conditions. Plate II is devoted to the spindles of different races. It is unfortunate that descriptive names are not applied to the terms, "whorl" and "spindle." A very cursory examination of the illustration will show that while the object of each is the production of spun thread, yet the difference in form, weight, and position of whorls, indicates that there was a corresponding difference in method. For example, the whorls of Egypt evidently acted as fly wheels and thus exerted a definite spinning function; whereas the band of pottery or copper ball on the Peruvian spindle was simply a device to prevent the completed cop of yarn from slipping. The other object from this latter country is in reality a weaving bobbin and not used in spinning at all.

The early form of spinning wheel shown in fig. 6, page 634, is an

immense mechanical advance over the earlier forms of hand spinning described (an illustration of one example of which is given in fig. 5 on the same page). The transition between these two forms is too abrupt; somewhere in the past there must have been intermediate techniques which would connect these methods.

If what has been said be taken in any sense as criticism, the intention of the reviewer has been defeated. The work is not only excellent, but is in reality the best paper of this nature it has ever been his good fortune to read. Its only fault is its brevity and perhaps its talented author will some day correct even this.

The fallacy of considering hand-loom weaving and machine-weaving as disconnected phenomena is fully exposed in this paper. The immense age of weaving, its continuous practice, even in its simplest forms down to our day, permits the great art to be very carefully studied. There is a great opportunity for the collaboration of the technical expert with the trained ethnologist and archeologist, to their mutual profit. The careful and studious works of Mr. Hooper along these lines are deserving of the highest praise.

M. D. C. CRAWFORD

NORTH AMERICA

The Ammassalik Eskimo. Contributions to the Ethnology of the East Greenland Natives. Edited by WILLIAM THALBITZER. Part I. Copenhagen, 1914.

This is in certain respects a new edition of Vols. ix and x of *Meddelelser om Grønland*, but in English instead of Danish. This feature, with the addition of many new illustrations and the incorporation of later observations, gives us essentially a new work. Three expeditions are reported upon:

(1) The expedition of Captain Gustav Holm, the discoverer of Ammassalik, carried out in 1883-85, (2) Captain G. Amdrup's expedition, entitled *The Carlsberg Fund Expedition to East Greenland*, and (3) W. Thalbitzer's voyage and wintering at Ammassalik in 1905-06, carried out in accordance with the instructions of the Commission for the Direction of the Geological and Geographical Investigations in Greenland, the expenses being defrayed by the Carlsberg Fund.

The Ammassalik Eskimo here designated are a semi-isolated group upon the east coast of Greenland, concerning which we had no very definite data before Captain Holm's return in 1885. Holm's expedition was originally projected to seek the traditional eastern settlement of the

old Scandinavian Northerners. No traces of such were found but Eskimo were encountered who had not for a long time at least been in contact with Europeans. These lived around the many indentations of the east Greenland coast opposite Iceland. Later, the Government established a post among them and the civilization of these interesting Eskimo proceeded rapidly. About 1898 the Amdrup expedition skirted the east coast, getting much farther north than the preceding one. Then in 1905 Dr. Thalbitzer spent a winter at Ammassalik. It is chiefly these last studies that form the weighty and essential parts of the present work.

The ice, climatic, and faunistic conditions at Ammassalik are not very different from those on the southern coast of Greenland. There is considerable driftwood and since the establishment of the government station a number of European articles have been picked up on the beach, suggesting the former possibility of some culture infusion. The total population of all settlements in 1884 was 413 (females 220). Among the culture traits of special interest are the peculiar long houses of turf and stone. These are one unit in width but may be as long as the number of families requires. A house fully described in the text contained places for eight families and housed thirty-eight persons. A settlement consists of a single house, as above, which has its effect upon the social organization. For each house there is a head man, or chief. At the initial visit Holm found iron knives in use exclusively, though the use of stone was remembered. Fire seems to have been produced by the strap drill only. Considerable vegetable food was eaten, some being stored for winter use. A good concrete discussion of the confession as used in the cure of disease is given by Holm. Highly developed wooden maps were in use indicating the place to camp, etc., and the native detailed knowledge of the coast was definite. A drum dance was used to settle disputes, the idea being to see who could ridicule the others down. As among other Eskimo, families often starved in winter and in consequence enforced cannibalism was not unknown. Suicide was rather frequent.

Among the physical characters of the East Greenlanders enumerated in the text we note that stature increases from south to north. In general the stock is purely Eskimo and surpasses in physical development the native population of West Greenland. Also, the linguistics of the east is widely divergent from the west.

The most important and culminating parts of the volume are Thalbitzer's discussions of the distributions for certain traits. For example, there is an excellent exposition of house types and their distribution. Three distinct types are found, a round whale bone house, a rectangular

and a pear-shaped house. The circular shape of the former is believed to be due to the materials alone. All three types occur among the East Greenlanders. A similar discussion of boats is deserving of notice. While the sail is used in West Greenland, it was not found in the east. The umiak was used at Ammassalik but it was not in use to the north. The same is true of kayaks. The harpoon is also considered; the "feathered" butt of the west is found in the east, also the knob. Space will not permit further enumeration. The sealing stool used in the east is like those of the Western Eskimo and not like those of West Greenland. One peculiarity of the East Eskimo is the absence of fish hooks.

The evidences for the use of iron on the east coast give rise to a critical examination of Solberg's theories as to the use of iron before the Norse period, our author tending to reject the view. The east shore people, at least, had only such iron as came to them in wreckage. A close study of stone tools, however, shows clearly that originally a stone age prevailed in the east and that the later iron tools of native make are of recent origin and tend to follow the old stone models.

Two very interesting objects are eye shades and sinew-twisters; both occur in East Greenland and Alaska, with no definite traces between.

At the end of the volume is a very full comparative discussion of the preceding data, leading to the conclusion that the East Greenlanders came both from the north and the south because in their culture are both distinctly West Greenland traits and those not found there but farther west. The northern migration is assumed to have followed the north shore of Greenland from the vicinity of Smith sound. In a more general discussion Thalbitzer supports the view that the Eskimo were dispersed from the Bering sea area and not from the vicinity of Hudson bay. However this may turn out, it is fairly clear that the original population of Greenland came from the northwest, one branch of which passed around the north coast and thence down the east side to Ammassalik, the other crossed at Ita and spread down the west coast. The latter managed at one time to reach Ammassalik from the south where the two cultures are fused. The author considers the first peopling of Greenland to have occurred not much earlier than 1000 A.D.

In closing this very inadequate summary it is not too much to say that in this work we have a masterpiece in the anthropology of the Eskimo and one that offers a fair substitute for a much needed general treatise upon Eskimo culture.

CLARK WISSLER

The Glenoid Fossa in the Skull of the Eskimo. F. H. S. KNOWLES. (Canada Geolog. Survey Mus. Bull. No. 9, anthrop. series No. 4, pp. 1-25 incl. four plates.) Ottawa, 1915.

The pronounced shallowness of the glenoid fossae in Eskimo skulls was the object of the author's comprehensive investigations. The fossa glenoidalis is divided into two parts by the Glaserian fissure. Serving for the articulation of the condyle of the lower jaw, the anterior portion of the fossa is the one taken under specific observation. It is bounded in front by the eminentia articularis, and is concave and smooth. The means of working the lower jaw against the upper in the act of mastication or triturating the food, upward, forward, and sideways in rotary motion, are principally the Mm. temporalis, masseter, and pterygoideus externus. These muscles are very strongly developed, as are the skeletal parts where they originate or insert. Besides being characteristics of a primitive type in general, these special features are of functionary origin. They are due to triturating a very tough and primitively prepared diet of a more or less purely animal nature, such as fish, flesh, fowl, raw whale skin (matak), etc. "An Eskimo's jaws are essentially of a biting and chewing type"—to explain this the author has recourse to the evidences furnished by comparative anatomy—and the extraordinary efforts employed to overcome the resistance of their food by a strongly side-to-side movement which also produces the peculiar attrition of the teeth, are responsible for the peculiar shape of the glenoid fossae. Their shallow form "is due most largely to the rolling and flattening out of the eminentia articularis, as well as perhaps to a relatively lesser depth of fossa." This state is different in civilized races, where the fossae are deeper. Their diet is of a softer kind favoring the diminution of the side-to-side movement. Instead of the incisors in the lower jaw being in apposition to those in the upper one, the overlapping bite has developed a tendency to narrowing of the palate. A table of diagrams and a number of photographic reproductions serve to illustrate the conditions described.

BRUNO OETTEKING

Indian Habitations in Sussex County, New Jersey. MAX SCHRABISCH.
Indian Remains near Plainfield, Union Co., and along the Lower Delaware Valley. LESLIE SPIER. (Bulletin 13, Geological Survey of New Jersey.)

Under the foregoing awkward double title the Geological Survey of New Jersey has put forth its second publication on the results of its preliminary archeological work.

The opening part of Mr. Schrabisch's treatise concerns the general archeology and physiography of Sussex Co. and is well handled, as are his introductory remarks on rock-shelters and cemeteries. Two types of burial hitherto unreported from this locality are recorded. One form is a cairn tomb, masses of rocks being heaped over the grave, and the other consisted of walling of the corpse in a small case. Neither variety was of common occurrence.

The section on trails, while probably essentially correct is rather too speculative to be of real value, but the part devoted to raw material is good. Besides the ordinary local stone, hematite, obsidian, and chalcidony are noted. The obsidian, at least, is presumably of distant origin.

Under the heading "Description and Location of Sites," Mr. Schrabisch enumerates his localities with interesting notes. His unfamiliarity with the accepted nomenclature of archeology, however, sometimes make his observations confusing. For example, in describing some shell pendants in the shape of birds found on the mainland near Minisink island (p. 29) on the upper Delaware, he refers to them as "bannerstones," a misapplication of the name of a well-known object. A wretched cut made from a field sketch accompanies the description.

In referring to chipped implements the author frequently calls them "beautifully carved" (vide pp. 33, 42) whereas he means shaped. On page 54 there is noted the discovery of a "double pointed fishhook." This is extremely interesting, since all types of fishhooks are rare hereabouts, and no "double pointed fishhook," whatever that may be, has ever been reported; yet no description or figure is vouchsafed us.

In marking the map Mr. Schrabisch has not used his symbols in the same manner as Mr. Spier. The symbol for "scattered relics"—sporadic occurrences of random implements—never occurs. Each place where traces were found is at least a "camp," hence sparsely settled localities over which Schrabisch has wandered and taken notes are apt to be unduly emphasized on the map. The temporary camping grounds in northern New Jersey thus assume a value equal to that of the densely populated Indian villages near Trenton or on Cohansey creek.

The intensive work done by Mr. Schrabisch on rock-shelters is very interesting yet unsatisfactory. Mr. Schrabisch repeatedly (see pp. 38, 40, 43, 53, etc.) refers to stratified relic-bearing layers, but gives no data or measurements. The reviewer knows of exactly two stratified shelters besides those mentioned in the paper under consideration,—one found at Armonk in Westchester County, New York, by M. R. Harrington,¹ the

¹ See *Anthropological Papers of the American Museum of Natural History*, Vol. III, p. 126.

other near Ardsley in the same county, explored by the Rev. Wm. R. Blackie and Leslie Spier. In the latter case the stratification was of recent origin due to burning brush and refuse; in the former great antiquity, though probable, need not be assumed.

Mr. Schrabisch repeatedly avers that pottery occurred only near the surface in his shelters, yet his own specific data contradict his general statements. For example, on p. 43, concerning the Gun Hollow shelter, he states:

About a thousand pieces of pottery were scattered through all the layers, though somewhat more frequently near the top, etc. . . .

On page 55 he says of Moody's Rock-shelter:—

The potsherds occurred in the upper strata only perhaps indicating a late introduction of the art of pottery making, but perhaps indicating that at first the shelter was visited only by hunters and later by families. . . . In the process were turned up at a depth of 3 to 30 inches. . . . Again, on reaching the bottom, the crevices between the boulders showed a dirt floor farther down.

This second floor was *not* examined, for on p. 54 we read:—

At the bottom tightly wedged boulders were found, beneath which, at a depth of 18 inches, another dirt floor was plainly visible, so that another and more ancient culture-bearing stratum may occur below. This hypothesis could not, however, be tested without the expenditure of much time and the labor of several men.

The theory of the late introduction of pottery as shown by the rock-shelters still stands as it did before the work was done,—probable, but unproven. Mr. Schrabisch or some other student should in the future take pains to give us a few accurate, laboriously taken accounts of shelters in which the delimiting measurements etc., are carefully taken.

The second portion of this book, by Mr. Spier, is eminently satisfactory as far as it goes. Mr. Spier apparently devoted his time to locating sites and did no intensive work, so that the results of his operations cannot fairly be compared with the work of Schrabisch, who apparently had a free hand.

ALANSON SKINNER

Social Life and Ceremonial Bundles of the Menomini Indians. ALANSON SKINNER. (Anthropological Papers of the American Museum of Natural History, vol. XIII, part I, 1913.)

The interesting contents of this volume form the first part of the ethnological material collected by the author during four summers' field-

work among the Menomini Indians. The second part will be published in another volume, treating of the cults and ceremonies, the folklore and mythology, while the data on material culture will be reserved for a future comparative study of the Central Algonkin group.

The author's informants in addition to his chief assistant, Mr. John V. Satterlee, U. S. Government interpreter and chief of Indian police at Keshena, were a number of Indians, nineteen of whom are mentioned; but regarding the way in which the information was obtained (whether directly from those Indians, Mr. Satterlee acting as interpreter, or mainly from Mr. Satterlee himself, his communications being supplemented or corrected, by the others) the reader is less fully informed. Of course, we do not mean that the author should have given a detailed account of the share of each informant, but that he might have informed us of his working method in a general way. The classification of the subject-matter is entirely in keeping with the title. The second and larger part of the book deals with "Cosmology and Medicine Bundles," while in the first ten chapters the following subjects are discussed successively: Home life of the Menomini; Social organization; Marriage customs; Terms of relationship; Children, birth and naming customs; Games; Months and seasons; Burial customs.

It may, of course, be objected that this classification does not always bring out the connection between some subdivisions (thus all that relates to war and hunting belongs as much to the social as to the religious life, and some chapters of the first part contain much that might just as well be mentioned under "Cosmology"), but on the other hand it facilitates the survey, and is at any rate to be preferred to every attempt at preserving the natural connection at any cost.

Though, in our opinion, the author sometimes goes rather too far in his striving after succinctness, and some further explanation concerning certain points would by no means have been superfluous, yet on the whole his descriptions and communications leave nothing to be desired in the way of clearness. In what follows I shall not try to give a brief summary of the contents of each chapter, but shall mention only what seems most important. It would, indeed, hardly be possible to compress the matter within a smaller space than the author himself has used.

The aversion to telling myths during summer, for fear of the "horrid old toad" (p. 5) I also found among the Ojibwa of Red Lake; this even caused me much delay in my work. In Red Lake that same toad (or frog) serves as a kind of bugbear with which they threaten naughty children, especially not very young girls, in which case the threat has a more or less obscene character.

The well-known case with which an Indian breaks his promises is explained by the author as arising from exaggerated respect for the rights of the individual. I perfectly agree with this explanation, but undoubtedly it often happens that in making his promise, he already intends not to keep it; this is, for the Indian feeling, less shocking than a flat refusal. When we read (p. 7): "It [the Menomini moral standard, judged from our point of view] is far higher than that of the Ojibway or Cree. . ." we would ask whether this statement is based on information given by Menomini Indians or on experiences of the author himself.

There are ten exogamic gentes, each of which embraces several sub-gentes. The leading subgens descends from the animal ancestor and, like the whole gens, bears his name. The principal, "royal," gens descends from the first Menomini, "the great bear." Formerly each gens had some special masculine and feminine proper names, none of which was ever allowed to be in desuetude. With the aid of an eighty-four-year old Menomini the author has succeeded in drawing up a complete, or nearly complete, list of all gentes, subgentes and gentile names. When Hoffman was working among the Menomini, the ancient system was already in a state of decay, and at present the exogamic rule too is no longer followed.

A person is in "joking-relationship" with his uncles and aunts, nephews and nieces, sisters-in-law and brothers-in-law on either side. The joking-relationship also implies the lawfulness of sexual intercourse. Very near is the relationship with nephews, nieces, brothers-in-law and sisters-in-law. Besides the mother-in-law taboo the father-in-law taboo is observed to a certain extent, but for the latter there is no fixed rule.

Civil authority is vested in the head chief, whose office is hereditary in the royal family of the royal gens. In his function of chief of the police he was assisted by the sacred war-bundle holders (by whom, by the way, were performed all military functions) and by all men of acknowledged bravery. One of these warrior police had charge of the peace pipe and played an important part in settling disputes, especially in murder cases. Retaliation was usually bought off with presents. The rice harvest, too, was regulated by the police.

The chapter on Government is followed by some useful comparative notes.

In general, marriage is a matter that concerns the parents more than the marriageable children themselves. The parents of the young man choose a girl, ask her from her parents, and the latter receive presents, which practically ends the matter. Both divorce and separation occurred

frequently. Adultery on the woman's side was punished in the well-known manner.

Before the birth of the child both father and mother abstain from certain kinds of food. Whether this custom is really to be considered as a "mild form of the *couvade*" (p. 35, note 2) is still doubtful (cf. Kunike, *Zeitschrift für Ethnologie*, 1911, p. 346 ff.). Sometimes the child receives its name from the parents, but if there is evidence of its being under the special protection of the powers above (a boy under that of the "thunderers," a girl under that of the "sky-sisters"), it is considered to have already a name and so this has to be found out. In doing this they often want the help of an old seer who understands the language of babies. In profane cases, too, such a person has often to lend his aid (likewise among the Ojibwa of Red Lake, cf. *Baessler-Archiv*, Beiheft V, p. 20). Such children lie under certain obligations towards their supernatural protectors; so, for instance, they have to play, at least once a year, a sacred game (lacrosse for the thunderers and shinney or dice game for the sky-sisters); and on the other hand, they have to be treated with special consideration lest they should get tired of their earthly existence. Besides their real name they have a so-called "lucky name," which is used only in the family circle, but which sometimes supplants the other. These "lucky names" consist in a certain number of fixed appellations for the eldest son, the eldest daughter, the eldest son but one, etc. So the eldest son, if he is a "thunder child" is often called "brother to the thunderers."

The dream fasting of youths and maidens lasts eight or ten days. Unfavorable dreams (in general all dreams bearing no relation to the powers above) are made no account of unless they have returned for the third time after a fast interrupted and afterwards resumed. Great importance is attached to these dreams and they influence a person's whole life. One may dream of four sets of "strong powers": the gods above, the gods below, the manitou animals, the sacred metal cylinder. The last named is supposed to be in the center of heaven. To common night-dreams, too, great importance is attached. A number of puberty-dreams have been noted down by the author. The menstrual customs among the Menomini do not deviate from the general type; only it is remarkable that if a menstruating woman should, contrary to rule, enter a house in which there are sacred objects, this can do no harm.

Nearly every game has a two-fold meaning: recreation and religious act. The following are described successively: Ball game, land or earth game (resembling the white man's "prisoner's base"), flying stick game,

snow snake, ice game, lacrosse, shinney, bowl and dice game, cup and pin game, moccasin game, cat's cradle, draw stick game, racing.

The Menomini reckoned by winters. The lunar year was divided into five seasons: winter, spring, summer, autumn, Indian summer. There are twelve lunar months (perhaps European) and six directions (up and down being counted among them.)

Most burial and mourning customs that are or were in use among the Menomini are also found among the related tribes, or at least unrelated neighbors. A mythical explanation concerning the "death bundle" (a very queer one though) is to be found in my Ojibwa texts (cf. *Baessler-Archiv*, Beiheft V, p. 6). I do not know if among other Ojibwa or related tribes the origin of this well-known custom is also connected with that particular episode from the trickster myth.

The general concepts of the universe of the Menomini deviate little from those of the neighboring tribes. However, among them the whole complex has more of the character of a religious system than is the case among the other tribes. As the basic principle of their religion the author considers "the struggling between two opposing forces: the good and the bad." This does not mean much, seeing that the same thing might be said of every form of religion without fear of contradiction. What the author really means, and what he, indeed, demonstrates further on, is that this struggle is very distinctly expressed in contrasting the powers above (good) with the powers below (bad). The universe above the earth is divided into four strata. In the topmost stratum dwells the supreme God, creator of the universe: Mätc Hāwātūk, whom the author—rightly, I think,—supposes to be originally identical with the sun, which seems to be borne out by his relation to the thunderbirds, his servants, who dwell in the following stratum. It seems, however, doubtful whether he should also be identified with the "essence of good" as the author thinks. But also to us it seems to be beyond doubt that he owes to missionary influences his modern character, coming very near the Christian conception of the Deity. In the third and fourth divisions of the upper world, respectively, dwell the sacred swan and the golden eagles, and the other birds, which are all servants of the thunderbirds. The chief of the underworld is the white bear, which according to the author personifies the essence of evil. He resides in the lowest stratum of the underworld and has a named bear as a servant. In the following division dwells the panther with his servant, the white beaver, and to the two upper divisions belong respectively the white deer (with the black cat) and the horned snake (with the dog). Especially the horned snakes

mostly called *mīskinū' bikuk*, are very well known, and play an important part in folklore. It is an interesting circumstance that tobacco is offered to the underworld powers as well as to the thunderbirds. Besides the regular powers there are in the sky and on the earth a host of strange, non-human beings that are malevolently disposed towards man in general and whose destruction is the unceasing care of the culture-hero, *Mā'nābus*. The Menomini version of the journey of the souls of the dead to the here-after (westward toward the home of *Mā'nābus*) shows no features unknown elsewhere.

The medicine bundles are to be divided into four groups: war bundle, hunting bundle, witch bundle, and good luck bundle. As to their origin the author advocates the theory that they are the gradual outgrowth, by accretion, of different separate charms. That this process really takes place may be considered as proved, but this does not prove that all the bundles always originate or have originated in this way. The whole bundles, as well as the medicines they contain are, as to their power, by no means personal. They may be transferred from one person to another without losing all of their power. This power results from three different qualities of the object: the power it has through contact with the beings who gave it; the power resulting from the dream with which it is connected; and the power of the songs belonging to it. If one does not know the songs one cannot do anything with the medicine. The bundles of the Menomini differ from those of several other tribes in this, that in being transferred from one person to another, their full power is not preserved. Most bundles are believed not to have come directly from the gods who made them, but to have been acquired through the intercession of lower powers. The war bundle was given by the thunderers, and the way in which this donation took place is told at length. Besides the medicines proper the thunderers also gave all kinds of regulations concerning war and the ceremonies connected with it. The most important of these are the semi-annual offerings (in spring and in autumn), when the voices of the thunderers are first heard, and the war ceremonies properly so-called: the war dance (before the fight) and the scalp dance (after it). He who had taken a scalp had to lick the fresh blood from it, and ceremonial cannibalism also frequently occurred, as the author tells us, "from pure bravado." There is no arbitrary limit to the number of war bundles in the tribe; any one who is urged to do so by a dream may make and use one. Formerly the songs belonged to the bundle as a whole. The American Museum of Natural History possesses eight war bundles, of which the author gives an illustrated description. His communications

concerning war customs are highly important, and their value is considerably enhanced by the songs noted down in Menomini. That the author has not or only partly normalized his spelling is sure to meet with approval.

Besides all kinds of small private medicines, the Menomini also use medicine bundles in hunting as well as in war. The principal of these are said to have been given to man by the gods through the medium of Mä'näbus and his brother. These are the "public bundles," and the use of them is connected with repeated important ceremonies. The most important, called Misasakiwis, which the author discusses at length, can be possessed only by some special individuals. Women are not only forbidden to possess it but even to touch it. The two other public bundles, which are of the same character, are to be considered, according to the author, as an offshoot of the first.

The private medicine bundles were acquired in different ways. With one of them is connected a myth which, as the author observes, resembles more the mythical traditions told among the Plains tribes in connection with medicines. This myth, namely, tells of a little girl that had been put outside the lodge by her mother, with the threat that the owls would come and fetch her away. She was really taken away by an owl, and later she was brought back to her home with a medicine that the owl had given her. Such private medicine bundles form indeed a transitional class between the public and the private medicines in a narrower sense.

Just as among most other Woodland tribes there are found among the Menomini small wooden images, made by the owner as the result of instructions in dreams. They represent the "God of good luck," and every possible blessing is expected from them. So they play the same part as the "good luck bundle," which is considered as a gift from the powers below.

Before concluding his review—which could, of course, hardly be more than a brief survey—the present writer would like to make a single observation of a more general character. It is easy to understand that the field-worker who has proper informants at his disposal, will do whatever he can to get informed as fully and thoroughly as possible concerning the subject he is studying. And, considered from this point of view, he is not to be blamed if he prefers a rich material in English to the results, much scantier as to quantity, which would have been yielded in the same space of time by the recording of texts. However, the present writer is convinced that the field-worker is justified in choosing

the first-named way of proceeding only if he thinks himself unfit for the other—certainly much more difficult—way, either in consequence of inadequate preparation or from some other cause. This not being the case with the author of the book just noticed, as appears from the many songs, we hope that he will in due time give us a collection of texts in some Central Algonkian dialect, recorded with the same painstaking care as the results published in this book, of his researches among the Menomini.

J. P. B. DE JOSSELIN DE JONG

The Fighting Cheyennes. GEORGE BIRD GRINNELL. Charles Scribner's Sons: New York, 1915.

At the outset the author states, "This book deals with the wars of the Cheyennes." And while this self-limitation is faithfully adhered to throughout, there does nevertheless creep in considerable discussion of other culture traits. Mr. Grinnell has always shown a deep personal feeling for the Indian of the Plains, in contrast to the mere professional attitude of many anthropologists. This is particularly true in the present work. The general plan of the book is to have the Indians tell their own stories in their own ways. Thus,

Since the Indians could not write, the history of their wars has been set down by their enemies, and the story has been told always from the hostile point of view. White writers have lauded white courage and claimed white successes. If it has been necessary to confess defeat, they have abused those who overcame them, as the defeated always abuse the victors.

Evidently there is another side to this history, and this other side is one which should be recorded; and, since the wars are now distant in time, the Indians' own descriptions of these battles may be read without much prejudice. I have tried to present the accounts by whites and Indians, without comment (pp. V-VI).

The high personal regard the author holds toward the narrators is indicated by the statement that "The old time Cheyennes possessed in high degree the savage virtues of honesty, trustworthiness, and bravery in the men, and of courage, devotion, and chastity in the women" (p. VI).

The book consists of thirty-one chapters, which in the main cover the period from 1830 to 1890, when the military activities of the Cheyenne may be said to have become a thing of the past. The earliest definite date set by the author is 1830 as the year in which the Pawnee captured the famous sacred arrows of the Cheyenne. Though no evidence for the correctness of this date is cited we assume that such exists. Before 1830 all is considered vague, but 1820 is taken as the probable date for certain

adventures with the Crow and 1817 as an uncertain date for a raid upon the Shoshoni. The definite engagements described include those with other Indians (Kiowa, Pawnee, Potawatomi, Sauk and Fox) and those with the United States troops (Sand Creek, Powder River, Ft. Phil Kearney, Hancock's campaign, Beecher Island, Crook's fight on the Rosebud, Capture of Dull Knife, the Lane Deer fight, etc.). To these should be added another contribution to the history of Custer's misfortune. It is thus clear that a very large part of the 431 pages recounts engagements between the Cheyenne and United States troops. While the author does not offer to comment upon the actual fighting, he energetically defends the Indian's cause by bringing forward data to show that he was in almost every instance forced to fight against his will.

While there are here and there parenthetical remarks by the author on Cheyenne traits, the first two chapters at least will interest the anthropologist.

The arrival of the Cheyenne at the Missouri is placed at 1676, they having been driven southwest by the Assiniboin. We should like to hear some discussion of this date because there is now quite a literature upon the assumed migration of the Cheyenne. It is regrettable that the author did not choose to give some notice to these references. Especially so since my colleague, Dr. Spinden, has found a Spanish reference to the name under date of 1695. De Vargas writes:—

While I was absent from this city there arrived a band of Apaches from the east, who are called Chiyenes, and they told in the town at which they arrived which is of the Picuriés tribe, how some men, white and light-haired, had destroyed a very large tribe of the Apaches Conejeros, living much further inland than their own. The Chiyenes then returned whence they came.¹

Remembering that at that period Apache was a general term for non-Pueblo tribes, we have something demanding further investigation. While the Cheyenne could have drifted down in a few years, how came De Vargas by the name? But to return to our subject, we are told that they lived for a long time near the earth-lodge dwellers of the Upper Missouri and took over some of their traits, but later on became true Plains people. The Cheyenne first met the Kiowa above the Black Hills on the Little Missouri River, ranging between the Crow and the Arikara. The Comanche were also in the same vicinity. The author apparently accepts the Cheyenne statement that they drove all these people out, the Crow northwestward, the Kiowa and Comanche southward, assisted

¹ Ralph Emerson Twitchell, *The Spanish Archives of New Mexico*, 1914, Vol. I, p. 265.

to some extent by the Arapaho. All this is stated as a matter of course but we can be sure the serious reader will want some corroborative evidence. Unfortunately, it is not altogether clear that the author as the Indian's spokesman arrived at all these data independently, though this is implied. If he did, we should have a good test case for the evaluation of historic tribal traditions. However, in this connection we find a case where what is given as a Cheyenne war narrative is but the variant of a widely distributed war tale. Thus it is claimed that a Cheyenne woman was once alone skimming fat by the light of a torch fastened over her head and routed an Assiniboin war party by whirling a piece of hot back-fat. This tale is found among a number of northern tribes; hence, that it was really a Cheyenne exploit is doubtful. The facts of distribution at once discount its value as tribal historical tradition and raise a proper suspicion as to the historical accuracy of all such narratives.

There is also a chapter on the "Ways of Warriors" in which the personal narratives of three individuals are given as types.

All in all this book is a worthy production and is one of the most complete collections of tribal traditional war narratives that has come to our knowledge. In all native accounts of this kind there is certain to be much miscellaneous information of great importance to comparative studies, the only difficulty being to find it. While the book has a good index, the conventional form of an index is certain to miss many of these, for their significance will not appear to the casual reader. The comparative student of Plains culture must go through the pages for himself and to such this volume is recommended.

CLARK WISSLER

SOME NEW PUBLICATIONS

Ankermann, Bernhard. *Verbreitung und Formen des Totemismus in Afrika*. (Zeitschrift für Ethnologie, 1915, Heft II u. III, pp. 114-180, with chart.)

Balch, Herbert E. *Wookey Hole, its Caves and Cave Dwellers*. With an Introduction by Professor Boyd Dawkins; Period Restorations and numerous Drawings by John Hassall, R. I.; Cave Photographs and Diagrams by I. H. Savory. Humphrey Milford, Oxford University Press, 1914, XIV+268 pp.

Barbeau, C. M. *Huron and Wyandot Mythology*. With an Appendix containing earlier published records (Canada Dept. of Mines, Geological Survey, Memoir 80; No. 11, Anthropological Series.) Ottawa, 1915. Pp. 437, of which 417-437 are plates.

Boas, Franz. *Publicaciones de la Escuela Internacional de Arqueología y Etnología Americanas, 1911-1912. Album de Colecciones arqueológicas. Ilustraciones por Adolfo Best. Pls. 69. Müller Hermanos: Mexico, Ave. San Francisco 28.*

Byington, Cyrus. *A Dictionary of the Choctaw Language. Edited by John R. Swanton and Henry S. Halbert. (Bureau of American Ethnology, Bulletin 46.) Washington, 1915. P. 611.*

Claridge, W. Walton. *A History of the Gold Coast and Ashanti. From the Earliest Times to the Commencement of the Twentieth Century. With an Introduction by Sir Hugh Clifford, K. C. M. G. London: John Murray, 1915. 2 vols.; pp. XXXIII, 649; XV, 638; 7 maps.*

Gehrts, Miss M. *A Camera Actress in the Wilds of Togoland. J. B. Lippincott Co.: Philadelphia, 1915. XX, 316 pp.; 40 ills., 1 map.*

Heye, George G. and Pepper, George H. *Exploration of a Munsee Cemetery near Montague, New Jersey. (Contributions from the Museum of the American Indian. Heye Foundation, Vol. II, No. 1.) Pp. 78, 1 map, 34 pls., 22 figs. New York: Museum of the American Indian. Heye Foundation, 1915.*

Jastrow, Morris, Jr. *The Civilization of Babylonia and Assyria. J. B. Lippincott Co.: Philadelphia, 1915. 8°, 1 map, 164 ills. (Price \$6.00 net.)*

Morley, Sylvanus Griswold. *An Introduction to the Study of the Maya Hieroglyphs. (Bureau of American Ethnology, Bulletin 57.) Washington: Government Printing Office, 1915. Pp. XVI, 284; 17 tables, 32 pls., 85 figs.*

Raphal, John R. *Through Unknown Nigeria. London: T. Werner Laurie, Ltd., no date. Pp. XIX, 361; 61 ills.*

Skinner, Alanson and Satterlee, John V. *Folklore of the Menomini Indians (Anthropological Papers of the American Museum of Natural History, vol. XIII, pt. III) New York, 1915. Pp. 217-546 (Price, \$1.60).*

Parkyn, Ernest A. *An Introduction to the Study of Prehistoric Art. Longmans, Green & Co., London, 1915. Pp. XVIII, 349; 16 pls.; 318 figs.*

Tafel, Albert. *Meine Tibetreise. Eine Studienfahrt durch das nordwestliche China u. durch die innere Mongolei in das östliche Tibet. Union Deutsche Verlagsgesellschaft, Stuttgart-Berlin-Leipzig, 1914. 2 vols., XI, 352 pp., 20 figs., 79 pls., 1 colored plate, 346 pp., 16 figs., 75 pls., map.*

Weeks, John H. *Among the Primitive Bakongo. J. B. Lippincott Co.: Philadelphia, 1914. XVI, 318 pp., 40 ills.*

ANTHROPOLOGY AT THE WASHINGTON MEETING WITH
PROCEEDINGS OF THE AMERICAN ANTHROPOLOG-
ICAL ASSOCIATION FOR 1915

By GEORGE GRANT MacCURDY

THE annual meeting of the American Anthropological Association was held December 27-31, 1915, at the United States National Museum, Washington, D. C., its scientific sessions being in affiliation with Section 1 of the Second Pan-American Scientific Congress, the Nineteenth International Congress of Americanists, the American Folk-Lore Society, the American Historical Association, and the Archaeological Institute of America. By virtue of this affiliation the attendance was large and the list of papers presented bearing on anthropology unusually long.

In honor of the occasion, the United States National Museum made provision for special exhibits. These included: (1) Physical Anthropology, by Dr. A. Hrdlička; (2) Indian Treaties of Historical Importance; (3) Economic Plants and Plant Products, by W. E. Safford; (4) Archeological Exhibits, by W. K. Moorehead, A. V. Kidder, and Julio Tello; and (5) Photographs, by Frederick Mosen and the Rodman Wanamaker Expedition.

Interwoven with the scientific sessions there was an elaborate social program, comprising a reception by the Secretary of State and the United States Delegation, and one by the Governing Board of the Pan-American Union, both held in the Pan-American Building; a reception by the Regents of the Smithsonian Institution; a luncheon by the National Geographic Society; a reception by the Trustees of the Carnegie Institution of Washington; a dinner and reception by the Cosmos Club; and finally after the close of the meetings, the reception at the White House by the President and Mrs. Woodrow Wilson.

REPORT OF THE SECRETARY

The Proceedings of the last annual meeting of the Association were published in the *American Anthropologist* for April-June, 1915. The selection of the place for holding the present meeting was left to the Executive Committee, which met at the American Museum of Natural History, New York, on February 20, 1915, and voted to hold the meeting

in Washington, D. C., in affiliation with the scientific bodies noted above; with the proviso that the program for the joint meeting be prepared in Washington and printed without expense to this Association.

A special meeting of the Association was held at Berkeley, California, August 3-5, 1915, the Secretary being in attendance. A report of this meeting was published in *Science* of October 15, 1915. A number of interesting papers were read, but no attempt was made to hold business meetings of the Council or of the Executive Committee. Chairman Waterman however did appoint a committee consisting of Drs. Sapir and Lowie, who were to formulate a protest against the discontinuance of anthropological research in the Philippines. The thanks of the Association are due to the University of California and the Panama-Pacific International Exposition for facilities offered, also to Professor T. T. Waterman, Acting Chairman of the Local Committee.

On December 4, the closing day of the Panama-Pacific International Exposition, an International Toast prepared by President Woodrow Wilson and typifying all that for which the Exposition has stood sponsor was the chief feature. President Chas. C. Moore of the Exposition having requested that our Association join in the closing day exercises by contributing a brief sentiment, the Secretary sent the following:

"In all ages contacts of peoples has been the chief contributing factor in the evolution and diffusion of civilization. As long as there was no way of bringing distant parts of the earth near, progress was slow. By immeasurably shortening trade and travel routes, the Panama Canal has therefore removed a mighty obstacle to world progress. By causing all nations to assemble at one time and place, an international exposition likewise contributes in its way largely to the same result. The Panama-Pacific International Exposition thus aptly symbolizes the quintessence of twentieth century civilization."

The Association has suffered a great loss in the death of Professor Frederic Ward Putnam, which took place in Cambridge on August 14, 1915. Professor Putnam was the last of the three founders of modern anthropology in America, the other two being Brinton and Powell. The only other loss thus far reported is that of Dr. W. L. Marsden, who died at Whittier, California, March 1, 1915.

Applications for membership,¹ 31 in number, are herewith submitted for election as follows: Edithe F. Ashmore, John F. Baer, H. E. Barnes, Orie Bates, R. M. Binder, Rev. John M. Cooper, G. H. Danton, P. L. Faye, Leo J. Frachtenberg, F. W. Fuller, H. K. Haeblerlin, Mrs. H. H. S.

¹ Full addresses are given in the list of members printed elsewhere in this issue.

Handy, E. W. Hawkes, A. M. Hocart, Neil M. Judd, Ralph Linton, S. K. Lothrop, Mrs. S. K. Lothrop, J. H. McGregor, B. W. Merwin, R. E. Merwin, Luis Montané, J. R. Murie, L. Parker, C. W. M. Poynter, W. H. R. Rivers, F. Schleiter, Beatrice L. Stevenson, L. A. Stone, J. C. Thompson, C. C. Uhlenbeck.

During the year President Hodge has appointed delegates to represent the Association as follows: To the National Conference on Race Betterment, San Francisco, August 5-8, George Grant MacCurdy; the Nineteenth International Congress of Americanists, Washington, D. C., December 27-31, Franz Boas and George Grant MacCurdy; the Second Pan-American Scientific Congress, Washington, D. C., December 27, 1915 to January 8, 1916, Clark Wissler and Charles Peabody.

REPORT OF THE ACTING TREASURER

At the meeting of the Executive Committee of the Association held in New York, February 20, 1915, on request of Mr. B. T. B. Hyde, Treasurer, the Secretary was appointed to serve as Acting Treasurer for the remainder of the year.

REPORT OF THE ACTING TREASURER

RECEIPTS AND DISBURSEMENTS, MARCH 1, 1915, TO DECEMBER 31, 1915

Receipts

Balance from the Treasurer, B. T. B. Hyde.....	\$	262.38	
Anthropological Society of Washington:			
<i>Amer. Anthropologist</i> , Vol. xv, No. 4			
<i>Amer. Anthropologist</i> , Vol. xvi, Nos. 1-4			
<i>Amer. Anthropologist</i> , Vol. xvii, No. 1.....	\$	303.04	
<i>Amer. Anthropologist</i> , Vol. xvii, Nos. 2-3.....		91.08	
Less amount still unpaid.....		191.08	203.04
American Ethnological Society:			
<i>Amer. Anthropologist</i> , Vol. xv, No. 4			
<i>Amer. Anthropologist</i> , Vol. xvi, Nos. 1-4.....		262.50	
<i>Amer. Anthropologist</i> , Vol. xvii, Nos. 1-3.....		188.67	451.17
Annual Dues.....			1,089.47
Annual Subscriptions to <i>Amer. Anthropologist</i>			437.62
Sale of back numbers, including Vol. II, No. 6, <i>Mem.</i>			42.68
Authors' reprints at cost.....			85.89
Miscellaneous.....			10.95
Total Receipts.....	\$	2,583.20	

*Expenditures*Printing, Binding, and Mailing *American Anthropologist*:

Vol. XVI and Vol. XVII, No. 1	\$1,733.89	
Vol. XVII, No. 2	494.50	
Vol. XVII, No. 3	488.09	
Printing <i>Memoirs</i> , Vol. II, No. 6	131.12	
	\$2,847.60	
Less printing bill unpaid	1,747.60	\$1,100.00
<i>Current Anthropological Literature</i>		362.04
Illustrations for <i>Amer. Anthropologist</i>		402.76
Expenses of Secretary and Acting Treas.		249.65
Expenses of Editor		240.91
Refund for overcharges		13.64
Postage stamps		1.57
Total Expenditures		2,370.57
Balance on hand		212.63
		<hr/>
		\$2,583.20

GEORGE GRANT MACCURDY,
Acting Treasurer.

REPORT OF THE AUDITING COMMITTEE

Your Committee calls the attention of the Association to the fact that (during the Treasurership of Mr. Hyde) it had been necessary to draw upon the permanent fund, which had accumulated primarily through life memberships, and that this fund has been entirely exhausted.

The receipt book of the Acting Treasurer shows an excess of nine dollars (\$9.00) over the total given above but this apparent discrepancy is plainly due to a slight error in entering the accounts. The balance in favor of the Association, as shown in the last statement of the New Haven Bank, agrees with that in the above report and the Committee is therefore pleased to ratify the account as submitted.

In approving the report of the Acting Treasurer, the Committee cannot refrain from expressing a word of appreciation of his untiring efforts in behalf of the Association. His has been a trying task and the faithfulness with which he has guarded the interests of the Association merits the commendation of all.

Signed:

TRUMAN MICHELSON,
NEIL M. JUDD,
Auditing Committee.

WASHINGTON, D. C.,
January 3, 1916

Following the reading of the Acting Treasurer's Report, a Committee on Ways and Means consisting of Franz Boas, P. E. Goddard, F. W. Hodge, and G. G. MacCurdy was appointed with power to act. This Committee reported at a later session of the Council:

WASHINGTON, D. C.,

December 31, 1915.

Your Committee, appointed with power to act, has given full consideration to the question of finances connected with the publications of the American Anthropological Association, and have reached the following conclusions:

1. That after 1916 no subscriptions for the annual volumes of the *American Anthropologist*, except for the back volumes, will be received, but that this journal will be sent only to members of the Association (including those of its local affiliated societies); but single copies and back numbers may be sold at rates to be determined by the Executive Committee.

2. That the *American Anthropologist* shall be supplied to the American Ethnological Society and the Anthropological Society of Washington for the use of their members at \$3.50 per annual volume, this charge to include the cost of wrapping and mailing.

3. That the *Memoirs* shall be sent without charge to the members of the American Anthropological Association and to those members of the American Ethnological Society and the Anthropological Society of Washington, who receive the *American Anthropologist* through those Societies.

F. W. HODGE

P. E. GODDARD

FRANZ BOAS

GEORGE GRANT MACCUDRY

The report of the Committee on Ways and Means led to the proposal of certain amendments to the Constitution as indicated below, the proposal being duly signed by Franz Boas, F. W. Hodge, and G. G. MacCurdy and referred to the Council at its final meeting on December 31:

ARTICLE III. *Membership*

By adding "or institutions" to Section 2, so that when amended the Section will read: "Persons or institutions interested in Anthropology may be elected on nomination of two members of the Association, and on payment of dues shall become Members of the Corporation, with full rights of voting and holding office."

By substituting for "member" the words: "person but not a library or other institution," to Section 3, so that when amended it will read: "Any person but not a library or other institution may become a Life Member on payment of \$100 at one time."

ARTICLE IX. *Finances and Property*

By omitting: "for members of the American Association for the Advancement of Science and of the American Folk-Lore Society the annual dues shall be \$5.00," from Section 3, so that when amended it will read: "The annual dues of members shall be \$6.00; for members of local affiliated societies that subscribe for the *American Anthropologist* for each of their members and which have adopted the *American Anthropologist* as their official organ, the dues shall be \$1.00."

REPORT OF THE EDITOR

At the time of the Philadelphia meeting in 1914 quite a part of Volume 17, Number 1 of the *American Anthropologist* was in type. The former editor, Mr. F. W. Hodge, carried that number through the press.

During the year the unusual conditions in Europe have been considered and articles by anthropologists residing in the countries at war and affected by the war have been solicited and several have been printed. It is hoped that in the future the *American Anthropologist* may be less confined to America both as regards its subject matter and its contributors.

It seems desirable that the *American Anthropologist* should become a medium of discussion, both of method and fact; for that reason articles raising points on which there is a chance for difference of opinion have been welcomed. As the output of anthropological writing increases it will be necessary to give preference to the shorter contributions and exercise more discrimination as to the character of the articles admitted. It seems but fair that if all articles offered cannot be printed that those of the recognized anthropologists should have preference. The financial condition of the Association is such that illustrations must be sparingly used unless the authors pay for the engraving.

PLINY E. GODDARD,
Editor

A number of important resolutions were adopted; some of these were in the nature of joint resolutions, others concerned only the American Anthropological Association, as will be seen from the context:

RESOLUTION RELATING TO THE DESIRABILITY OF UNIFORM LAWS CONCERNING
ARCHEOLOGICAL EXPLORATION*Section I*

WHEREAS, many parts of the American continent are rich in archeological remains, such as ruins, monuments and burial sites, containing many examples of industry and art of the aborigines;

AND WHEREAS, scientific explorations of these remains with the study of resulting finds are objects of utmost importance, for on their basis only will it become possible to reconstruct the lost history of the American race;

AND WHEREAS, in order that such remains may be saved to science and not be wantonly exploited or destroyed before they could be studied, it is essential that proper laws and regulations be adopted by the various countries where such remains exist, the object of such laws and regulations being to hinder or prevent as far as possible the digging or other destruction of such remains by unqualified persons; to prevent trade in pottery and other articles recovered from the ruins and graves, and at the same time not only to enable properly qualified scientific men both indigenous and of other countries to undertake and carry on scientific explorations and collections,

AND WHEREAS, the majority of the American Republics have now some laws relating to antiquities, although these laws are unlike in the different countries and in some instances are such that they have resulted more in restraining than in advancing properly qualified research;

Therefore it is hereby resolved by the Second Pan-American Congress, that it is highly desirable that the various American Republics arrange by the appointment of suitable delegates, possibly from among their official representatives at Washington, for joint action on this important subject, with the view of formulating generally acceptable and substantially uniform laws relating to the conservation, exploration and study of archeological remains in their several jurisdictions; laws which on one side will effectively safeguard these remains from wanton destruction or exploitation, and on the other will aid and stimulate properly organized and accredited research in these directions.

RESOLUTION RELATING TO THE ADVANCE OF ANTHROPOLOGICAL RESEARCH IN THE
VARIOUS AMERICAN REPUBLICS

WHEREAS, in various parts of the American continent there are remnants of the aborigines population, a study of which is of great importance to science;

AND WHEREAS, many of these remnants are very imperfectly known and are rapidly disappearing;

AND WHEREAS, properly made and preserved collections, ethnological and physical, are among the most precious scientific and educational assets of a nation;

Therefore be it resolved by the Second Pan-American Congress, that delegates to the Congress be urged to use every opportunity to impress upon their respective governments, institutions, and people the importance of promoting research in this field, of organizing surveys for the study of the primitive tribes, and of building up national and local museums for the preservation of the data and materials collected.

The two foregoing resolutions were passed not only by the American Anthropological Association but also by the International Congress of

Americanists, the latter providing for an intermediary local bureau in Washington consisting of W. H. Holmes, F. W. Hodge, and A. Hrdlička.

RESOLUTION ON THE DEATH OF PROFESSOR FREDERIC WARD PUTNAM
(Prepared by Alfred M. Tozzer and Marshall H. Saville)

WHEREAS, by the death of Professor Frederic Ward Putnam, the American Anthropological Association has lost one of its most eminent founders, one of its most eminent supporters, and one of its most lovable characters;

Be it resolved that the Association here express the sense of this great loss to American Anthropology, a loss that is felt not only by the many pupils of Professor Putnam in the several institutions throughout the country, but also by those who have long been connected with Professor Putnam through all the years of struggle to make Anthropology a recognized field of scientific endeavor; and *be it further resolved* that these minutes be spread upon the records of the Association and also be sent to the members of Professor Putnam's family.

RESOLUTION OF THE AMERICAN ANTHROPOLOGICAL ASSOCIATION RELATING TO THE
DESIRABILITY OF RESUMING THE OPERATIONS OF THE ETHNOLOGICAL SURVEY
OF THE PHILIPPINE ISLANDS

(Prepared by Edward Sapir and R. H. Lowie)

The members of the American Anthropological Association have learned with great regret of the decision to suspend the operations of the Ethnological Survey of the Philippine islands. The native populations of the Philippine islands are among the most interesting of the globe from a scientific point of view. They include a pygmy race whose study will shed light on the physical anthropology and culture of one of the most primitive divisions of mankind. On a higher level a host of Malay tribes require investigation for the purpose of determining their relations with one another and with alien groups. In short, the Philippines offer an unusually rich field for important research which should not be left to the accident of private interest.

It is therefore respectfully urged by the American Anthropological Association that the proper authorities authorize the resumption of anthropological research in the Philippine islands at the earliest opportunity.

On January 19, 1916, the Secretary received a reply from Mr. J. L. Hunt, assistant to the Chief of the Bureau of Insular Affairs (War Department), from which the following is taken:

"Anthropological work which has been carried on in the Philippine islands has not been done by the Federal government or maintained at Federal expense, but has been carried on by the Philippine government through its Bureau of Science. Some months ago the Philippine government found it necessary to greatly curtail its expenses on account of a considerable falling off in its revenues, and among other activities of the Philippine government which had to be suspended or discontinued were those in connection with anthropology.

"A copy of your letter is being transmitted with its inclosure to the Governor General of the Philippine islands at Manila for consideration by the proper authorities there."

RESOLUTION FAVORING BILL TO DISCONTINUE THE USE OF THE FAHRENHEIT THERMOMETER SCALE IN GOVERNMENT PUBLICATIONS

WHEREAS, there is now pending in Congress a Bill, known as H. R. No. 528, to discontinue the use of the Fahrenheit thermometer scale in Government publications;

Be it resolved that said Bill have the support of the American Anthropological Association.

A vote of thanks to the Regents and Secretary of the Smithsonian Institution for the facilities so generously placed at the disposal of the Association and for the reception at the National Museum was unanimously carried.

The Chair appointed a Committee on Nominations consisting of A. L. Kroeber, M. H. Saville, G. G. MacCurdy, A. M. Tozzer, and R. H. Lowie, whose report was accepted by the Association, the election of officers resulting as follows:—

President: F. W. Hodge, Bureau of American Ethnology.

Vice-President, 1916: A. L. Kroeber, University of California.

Vice-President, 1917: George B. Gordon, University of Pennsylvania.

Vice-President, 1918: Berthold Laufer, Field Museum of Natural History.

Vice-President, 1919: Alfred M. Tozzer, Harvard University.

Secretary: George Grant MacCurdy, Yale University.

Treasurer: Neil M. Judd, U. S. National Museum.

Editor: Pliny E. Goddard, American Museum of Natural History.

Associate Editors: J. R. Swanton, R. H. Lowie.

Executive Committee: The President, Secretary, Treasurer, and Editor (*ex-officio*), C. Wissler, E. Sapir, J. W. Fewkes.

Council: F. Boas, W. H. Holmes, J. W. Fewkes, R. B. Dixon, F. W. Hodge, A. L. Kroeber, George B. Gordon, B. Laufer, A. M. Tozzer, G. G. MacCurdy, Neil M. Judd, P. E. Goddard (*ex-officio*); Byron Cummings, G. H. Pepper, W. C. Farabee, J. R. Swanton, G. G. Heye, H. J. Spinden, T. T. Waterman, C. M. Barbeau, W. D. Wallis, A. B. Lewis, Stansbury Hagar (1916); W. C. Mills, H. Montgomery, C. B. Moore, W. K. Moorehead, E. K. Putnam, C. Peabody, C. C. Willoughby, T. Michelson, A. B. Skinner, M. H. Saville (1917); Alice C. Fletcher, C. P. Bowditch, S. Culin, R. H. Lowie, C. H. Hawes, E. Sapir, N. C. Nelson, H. Bingham, J. A. Mason, G. A. Dorsey, E. W. Gifford (1918); A. E. Jenks, S. A. Barrett, W. Hough, A. Hrdlička, B. T. B. Hyde, C. Wissler, F. G. Speck, A. A. Goldenweiser, E. A. Hooton, A. V. Kidder, F. C. Cole (1919).

The incoming President, Mr. F. W. Hodge, has appointed the following committees:

Committee on Program: George Grant MacCurdy (chairman), Roland B. Dixon, Alice C. Fletcher, Aleš Hrdlička, A. L. Kroeber, Berthold Laufer, Clark Wissler.

Committee on Finance: Charles Peabody (chairman), Edward E. Ayer, Charles P. Bowditch, William H. Furness, George G. Heye, Clarence B. Moore, Homer E. Sargent.

Committee on Policy: Franz Boas (chairman), Roland B. Dixon, J. Walter Fewkes, W. H. Holmes, Robert H. Lowie, George G. MacCurdy.

Committee on Publication: F. W. Hodge (chairman *ex-officio*), Hiram Bingham, Stewart Culin, P. E. Goddard (secretary *ex-officio*), A. A. Goldenweiser, G. B. Gordon, Walter Hough, Neil M. Judd, A. L. Kroeber, Berthold Laufer, E. Sapir, M. H. Saville, John R. Swanton, A. M. Tozzer

To represent the Association on the Council of the A. A. A. S.: W. H. Holmes and Franz Boas.

On invitation from Dr. P. E. Goddard, it was voted to hold the next regular meeting of the Association at the American Museum of Natural History, New York City, on December 27-30, 1916, in affiliation with Section H of the American Association for the Advancement of Science.

Nearly one hundred titles were offered in the joint program; with but few exceptions the author was present and read his paper. A large majority of the abstracts were presented through the International Congress of Americanists in the published report of which the more important papers will appear in full.

PROCEEDINGS OF THE ANTHROPOLOGICAL SOCIETY OF WASHINGTON

Meeting of October 13, 1915.

At the 488th meeting of the Society, held October 13, 1915, in the Public Library, jointly with the Medical Society of the District of Columbia, Dr. Aleš Hrdlička, Curator in Physical Anthropology, U. S. National Museum, delivered an address on "The Evolution of Man in the Light of Recent Discoveries, and its Relation to Medicine." Human evolution is no longer a mere theory but a fixed part of natural history, better documented from day to day by substantial evidence. Its foundations rest upon many and important organic analogies; on actual physical remains of early man and perhaps even some of his predecessors; and on observations of the changes which are at present taking place in man. The analogies are (1) the evidence of evolution in all the better known mammals; (2) the relation of various stages of the embryonic development of man to grades of life represented by some lower vertebrates; (3) those of the mode of conception, of the laws of development, of all other vital functions, and in death; (4) similarities in organs, limbs, and all other physical as well as microscopic parts of the human body; (5) close similarities in the chemical constituents of the human body and those of other mammals; and (6) the frequent presence in man of vestiges of or reversions to anatomical features still present regularly in some lower animals.

The physical evidence of man's evolution consists of a large series of skeletal remains dating from the early Pleistocene to the last prehistoric period. These remains show in general that the farther back we proceed the more primitive were the human features and the nearer to those of the lower primates. This evidence alone is quite conclusive although there are still of course, many important gaps in the line of this evidence, especially relating to the earlier periods, which however are gradually being filled in. The historical and recent changes in man show us that his evolution has not as yet been fully accomplished, but is still progressing, and that possibly among civilized white men it is progressing more rapidly than it has during most of its course. We see that the higher civilized white man has already in some respects outdistanced others,

that he is rapidly diversifying, and that those who can not keep the accelerated pace are being eliminated by nature. Probably the most obvious changes are taking place in his teeth, which are gradually lessening in resistance, in size, and even in numbers—changes which in turn condition weakening and numerous disharmonies in the whole facial structure.

The process of human evolution has close relations to medicine—much closer, in fact, than is commonly appreciated by even the surgeon and physician. Evolution is not only constructive, but eliminative, involving weakening, degeneration, and eventual loss of parts which have become less useful, less functional. The progressive and retrogressive changes are not always harmonious or generally beneficial to the individual, and they bring about many conditions which demand medical or surgical intervention. The process of evolution bears, however, still older relations to medicine. It has prolonged the periods of infancy, childhood, and senility in man, the most dangerous periods of an organism; the assumption of the erect posture had necessarily adverse consequences, which probably have not yet been completely overcome, on the circulatory system and in seriously modifying the abdominal and pelvic drags as well as pressure, especially in pregnancy; it has intensified the sexual functions in man, the results of which are frequently untoward and even dangerous; it has caused an enlargement in the size of the head in the human foetus, which necessitated a consequent enlargement of the pelvic cavity, and there are doubtless still disharmonies between the two conditions; it has resulted in greater relative slenderness of bones, even in the skull, rendering them proportionately more liable to injuries; it has brought about greater delicacy of skin, with a consequent less resistance of the body to exposure; it has induced especially a great enlargement of the brain, a process the results of which to this day offer many imperfections; and, finally, while evolution has doubtless improved various immunities in man, it is still very incomplete in this respect, and on the other hand it has evidently led to new dangers and predispositions. There seem to exist even some indications that it may in some of the most advanced groups adversely affect the ability of procreation. The evolution of man will continue, and in order that it shall proceed with the least harm and towards the greatest benefit of mankind, it will require the most enlightened and increasingly important help and service of all branches of medicine.

The paper was well illustrated and briefly discussed.

Meeting of October 19, 1915

At the 489th meeting of the Society, held October 19, 1915, in the Public Library, Dr. D. S. Lamb, of the Army Medical Museum, read a paper on "The Medicine and Surgery of the Ancient Peruvians," giving first some account of the country and its people, their history, customs, food, and religion. We have no evidence of hospitals in old Peru. The people are said not to have studied the medicinal properties of their plants, although they well knew the properties of what is called Peruvian bark, used in malarial fevers. Whether syphilis or leprosy occurred among them is doubted. The same may be said of tuberculosis, although some writers, like Ashmead, ascribe the mutilations represented on their pottery to local skin tuberculosis, usually known as *lupus*. These mutilations have also been regarded as resulting from punishments or surgical operations. Three skin diseases are considered peculiar to the ancient Peruvians, the *mirunta*, caused by a worm entering the skin; the *verrugas*, a very fatal disease of a warty character that struck terror into Pizarro's soldiers in 1532; and the *uta*. They had the climatic, dietetic, respiratory, and heart diseases found elsewhere, and from similar causes. Malarial fevers prevailed and were usually of the tertian variety. Smallpox, measles, scarlet fever, and yellow fever were introduced by the Spaniards and their successors. The Peruvians had what seems to have been a typhus called *tabardillo*. Goitre prevailed and was said to be caused by drinking the turbid water from the mountains. They deformed the heads of their infants, very much as did the Flathead Indians of the northwestern United States, by pressure front and back; one tribe is said to do so still. Their injuries were necessarily, for the most part, much the same as now, with the exception of shot wounds and injuries caused in modern industrial occupations. They scarified and let blood, reduced dislocations, used fixation apparatus for fractures as we do, covered open wounds, cut out *pterygiums*, and trephined the skull. This trephining was done either directly to relieve disease and injury or simply to let out the demon that caused the trouble.

In discussing Dr. Lamb's paper, Dr. C. L. G. Anderson said that the predecessors of the Inca also, the people who built the megaliths at Tiahuanaco and the great fortress at Cuzco, likewise knew much about medicinal herbs. The Indians made infusions, decoctions, powders, and ointments of barks, leaves, berries, roots, and vines. A few remedies were obtained from the mineral kingdom, such as sulphur and salty earths. Certain baths and hot springs were utilized in curing rheumatism and various skin diseases. Garcilasso de la Vega says that the use of drugs

was largely prophylactic and that after the disease was well established they left nature to work its cure, merely regulating the diet. The basal idea was to eliminate the evil, whether spirit or substance. Hence, purgatives and venesection were much in vogue, as among all nations.

Throughout tropical America, the wood of the *guayacan* tree, *lignum vitae*, was held to be a specific for the venereal disease called by the Spaniards *las bubas*. Sarsaparilla was said to be the great panacea about Guayaquil. The wonderful drugs *coca* and *quina-quina*, were peculiar to the Andean regions. The coca was chewed to ward off hunger and fatigue. Quina, later known as Peruvian bark, was the cure for fever. It was introduced into Europe about 1640. Among the common people, old women were herbalists. The newborn babe was bathed in cold water. Usually no midwife was employed. The Peruvians knew of many poisons. Witchcraft and divination were practised.

Mr. J. N. B. Hewitt spoke of the idea of getting the evil spirit out of the patient as being common to all primitive peoples. In the Iroquois language the expression in case of sickness was "It is biting me," "biting my tooth," or "biting my head," according to the affected part. Dr. E. L. Morgan, among others who discussed the paper, considered that trephining probably had its origin in the idea of getting rid of the evil spirit but was continued as a custom because of the curative results observed in some cases. Dr. Lamb, in response to an inquiry, said that the flattening of the head among the ancient Peruvians, as among the Flathead Indians, probably had no effect on the intellect because it was practised in infancy.

Meeting of November 2, 1915

At the 490th meeting of the Society, held November 2, 1915, in the Public Library, Dr. Walter Hough, of the U. S. National Museum, spoke on "Progress in Anthropology in California." He first discussed the problems connected with the populating of California by the Indians, giving a general view of the geographical obstacles and the avenues to the north and south by which migrants entered. The conditions as to food, water, and means of transportation were shown to have greatly influenced the condition and direction of the migrations. A brief review was given of the numerous stocks of Indians in California and attention called to the similarity as to the prevalence of numerous tribes in the Mexican gulf area studied by Dr. J. R. Swanton. The Pacific coast was described as a vast ethnic enclave, a veritable swarming place of tribes, whose origin, antecedents, and development in most instances perplex

the ethnologist. California presents a most interesting field of study to anthropologists. Californian historians are alive to the value of these studies as a groundwork for history, and the speaker mentioned the work of H. H. Bancroft, Charles F. Lummis, Robert E. Cowan, and others who have contributed valuable work.

Progress in museum display of anthropological material was noted and the great collections in San Francisco and Los Angeles described. The speaker found evidence of the increasing growth of civic pride in sustaining the work and adding to the effectiveness of museums. It was said also that the University of California is a force for anthropological science in California, and the intelligent patronage of Mrs. Phoebe A. Hearst in this direction was praised since she had made possible the important researches of Dr. A. L. Kroeber and others and the enriching of a great museum through exploration. An account was given of the work in the more than 400 shell mounds of San Francisco bay carried on by E. W. Gifford, N. C. Nelson, and T. T. Waterman, and of the explorations among the Indian tribes.

The two great expositions which California has successfully carried on this year are of great import to anthropology, especially that at San Diego, where this subject was preëminent, the San Francisco Exposition being mainly devoted to modern progress. This anthropological exhibit of the former, which was prepared by Prof. W. H. Holmes, Dr. Aleš Hrdlička and others of the United States National Museum in co-operation with Dr. E. L. Hewett, has never been excelled, and it will be a permanent contribution to California. The speaker said, in closing, that there is being built up on the West Coast a people of general culture who are appreciative and receptive of the researches of science. It augurs well for the science of anthropology here that it has an alert public which aids in the extension of its activities—a public that demands and can assimilate its results.

Meeting of December 7, 1915

At the 491st meeting of the Society, held in the Public Library, December 7, 1915, Mr. Francis LaFlesche, of the Bureau of American Ethnology, read a paper on the "Right and Left in Osage Rites." The Osage, at the formative period of their tribal organization, had arrived at the idea that all life proceeded from the united fructifying powers of two great forces, namely, the sky and the earth. They also perceived in these two forces an inseparable unity by which was made possible the continuity of the life proceeding from them. It was upon these con-

ceptions that they founded their complex gentile organization. They first divided the people into two great divisions, one of which they called "Tsi-zhu" (household), symbolically representing the sky, and the other, "Hoⁿ-ga" (sacred), representing the earth. These two great symbolic divisions they brought together to form one body which they likened to a living man. He stood facing the east, the left side of his body, the Tsi-zhu division, being to the north, and the right side of his body, the Hoⁿ-ga, being to the south.

When a war party including men of both the great tribal divisions was being organized, the people pulled down their wigwams and reset them in a ceremonial order, which was in two squares with a dividing avenue running east and west. In this arrangement the position of the symbolic man was changed so that he faced the west; consequently the right side of his body, the Hoⁿ-ga division, was at the north, and the Tsi-zhu division, at the south. All the ceremonial movements were made in reference to the right and left side of the symbolic man, as was also the placing of the symbolic articles used in the ceremonies. The portable shrine has a right and a left side. When the ceremonies of the tribal war rites were being performed, the shrine was put in its place so that the left was toward the Tsi-zhu and the right toward the Hoⁿ-ga. When a man was initiated into the mysteries of the war rites, the shrine of his gens was temporarily transferred to his keeping. If he belonged to the Hoⁿ-ga division he hung the sacred article at the right side of his door when viewed from within; if he belonged to the Tsi-zhu division, he hung it at the left of his door. A woman for whom a sacred burden-strap had been ceremonially made, hung the sacred article at the right side of her door if she belonged to the Hoⁿ-ga division, at the left side if she belonged to the Tsi-zhu division. The observance of right and left pertained to many details connected with the tribal ceremonies and appeared in the daily customs of the people.

The paper was discussed by Miss Alice C. Fletcher and Messrs. Hodge, Swanton, Fewkes, Mooney, and Michelson, among others. Similar dualistic concepts regarding right and left or earth and sky as determining social relationships and fundamental modes of conduct were reported as found in widely separated tribes, such as the Hopi of the Southwest and the Piegan of the north. The discussion centered largely upon the significance of 7 and 6 as sacred numbers, which are found widely spread in ancient and oriental nations as well as in America. Several members referred the origin of 6 as a sacred or occult number to the six "cardinal points," north, south, east, west, up, and down. The number

7 adds to these the concept of the center between the points. Dr. Fewkes referred at length to his earlier studies of the preference given the left hand in the sacred mysteries of the Zuñi and what he has called the "sinistral circuit," which was followed, for instance, in Zuñi processions and by anyone approaching the kiva. Some theories account for this significance of the left side by being the side where lies the heart and the side which supports the shield in battle. Miss Fletcher dwelt upon the intellectual and especially the poetic and anthropomorphic character of these concepts of the Indian thinker who faces nature in the open and feels impelled to think out and give reasons for things. Is not the sky side, the left, in the Osage conception given the place of honor because of a deep feeling of its religious significance?

DANIEL FOLKMAR,

Secretary

ANTHROPOLOGICAL NOTE

A NOTE ON BLACKFOOT RELATIONSHIP TERMS

IN the *Internationale Archiv für Ethnographie*, XXIII (1915), p. 140, Professor Uhlenbeck comments on Mr. Leslie Spier's remarks on Blackfoot relationship terms which were published in this Journal, 1915, pp. 603-607. Professor Uhlenbeck has quite misunderstood the purpose of Mr. Spier's contribution. At my instance Mr. Spier examined with great care the extant data on Blackfoot kinship nomenclature. As he points out, Morgan's comprehensive tabulation is vitiated by obvious errors, contradictions, and atrocious phonetics. Unfortunately, the resulting perplexities have not been eliminated by later lists, however superior in other respects, for the simple reason that they are not co-extensive with Morgan's. To call attention to the existing difficulties and to "stimulate the acquisition of new material for the correction of the old" was Mr. Spier's sole object. Professor Uhlenbeck, oddly enough, seems to suppose that Mr. Spier has sucked his Blackfoot kinship terms out of his thumbs. He blames him for assuming the existence of an *r* sound and for correlating Piegan *d* with Blood *t*. Mr. Spier simply transcribed the forms given by Morgan. If Professor Uhlenbeck and Dr. Michelson shall be led to publish complete and phonetically accurate schedules of Blackfoot terminology to supplant Morgan's lists, Mr. Spier's plea will not have been in vain.

ROBERT H. LOWIE

THE PRESIDENT OF THE UNITED STATES has performed a dual service to science in creating, by proclamation dated February 11th, 1916, the Bandelier National Monument in New Mexico. This monument, which has been set aside under the provisions of the Act of Congress of June 8, 1906, is designed for the purpose of affording protection against vandalism and unlawful excavation of the ancient pueblo ruins and other aboriginal remains lying within an area of more than twenty thousand acres of land within the limits of the Santa Fé National Forest, which include such important objects as the cavate lodges of the Rito de los Frijoles, the Painted Cave, the Stone Lions, and the ruins of Otowi and Sankawi. Incidentally the name of the late Adolf F. Bandelier, whose highly important studies in the archeology and early Spanish history of the

Southwest under the auspices of the Archaeological Institute of America and the Hemenway Expedition are so well known, is perpetuated by the proclamation.

DR. ALBERT ERNEST JENKS, Professor of Anthropology, and Chairman of the Department of Sociology and Anthropology, University of Minnesota, has returned to the University the second semester of the academic year. He had leave of absence during the first semester to continue summer research on the subject of Indian-white amalgamation in Minnesota. This research was carried on for citizens of Minnesota who are defendants in suits brought by the United States Government in connection with transfer of land titles on the White Earth Reservation. In 1906 an act was passed by Congress, amended in 1907, allowing "mixed-blood Indians" to sell their White Earth allotments. The Government makes charge that certain lands were sold by pure-blood Indians under the pretense that said sellers were mixed-bloods. Of the nine court cases tried so far with anthropological evidence the Court has held that the sellers in eight cases were mixed-blood Indians.

ANNOUNCEMENT of some important discoveries is contained in a letter from Mr. Clarence B. Moore to Mr. F. W. Hodge, Ethnologist-in-Charge of the Bureau of American Ethnology. Mr. Moore says:

"We have just completed a month's steady work on a site on Green river Kentucky, where conditions were peculiarly favorable to the preservation of skeletal remains. We had the good fortune to obtain a large number of skulls and other bones in fine condition, a most unusual thing in investigation in the South.

"We have also demonstrated beyond doubt, from material obtained during our digging that the oblong, longitudinally-perforated "banner-stone" is in reality a sizer used by the aborigines to space the meshes in making nets."

The skeletal remains are to be presented by Mr. Moore to the United States National Museum.

AT the time of writing Mrs. W. S. Routledge is returning to England after an extended visit to Easter Island in the company of Mr. Routledge, who is taking their boat through the Panama canal. Mrs. Routledge devoted herself mainly to the less tangible aspects of native life, while her husband studied more particularly the archeology and material culture. Mr. and Mrs. Routledge will be remembered as the authors of an excellent monograph on the Kikuyu of East Africa entitled *With a Prehistoric People*. Before sailing Mrs. Routledge paid a visit to the

Affiliated Colleges Museum at San Francisco, the United States National Museum in Washington, and the American Museum of Natural History in New York.

MR. WARREN K. MOOREHEAD, of Andover, Massachusetts, is preparing a volume on Indian stone ornaments and problematical forms. He will be glad to receive communications from museum curators and those interested in technical study of prehistoric stone ornamental objects and the distribution of such forms. Mr. Moorehead will present a number of maps showing areas in which ornamental and problematical forms known as banner, winged and bird stones; charms and amulets, etc., are found. The relation of these to the distribution of linguistic stocks will be carefully indicated.

At a meeting of the Managing Committee of the International School of Archaeology and Ethnology in Mexico held in New York on January 24, Señor Luis Castillo Ledón was elected President of the Managing Committee and Señor Manuel Gamio "*Encargado de los trabajos.*" The work of the School for the present year will be under Señor Gamio's direction.

MAJ. FREDERICK H. E. EBSTEIN, U. S. A., retired, veteran of the civil and Spanish-American wars and of Indian fighting and regarded as an authority on the ethnology of the Indian race, died at his home in Brooklyn, February 9, 1916, aged sixty-nine years.

THE UNIVERSITY OF WASHINGTON is now offering courses in anthropology under the direction of its Department of Zoology. The lectures in ethnology are given by Professor Trevor Kincaid who writes that the courses are proving very popular.

MR. ALANSON SKINNER, assistant curator in the Department of Anthropology of the American Museum of Natural History since 1912, has resigned to take a position with the Museum of the American Indian, Heye Foundation.

THE Academy of Sciences at Vienna has granted a further subsidy of \$960 to Professor R. Pösch to continue his anthropologic measurements and photographing of the various ethnologic types among the prisoners of war.—*Science.*

MR. ARTHUR CARPENTER, a Graduate Student of the Division of Anthropology, Harvard University, has left for an exploring trip to Guatemala under the auspices of the Peabody Museum.

MR. SYLVANUS GRISWOLD MORLEY, Carnegie Research Assistant, has started on a trip which will include Copan and Quirigua, Ocosingo, and several of the ruins on the Usumacinta River.

PROFESSOR WILLIAM H. HOLMES left Washington February 14, 1916, to visit the ruins of Quirigua and Copan where he is to spend a few weeks with Mr. Sylvanus Griswold Morley.

DR. WALTER HOUGH of the United States National Museum has gone to California to reinstall the San Francisco government exhibit in the San Diego exposition.

A UNIVERSITY OF CALIFORNIA expedition under Mr. Leonard Outhwaite has left for an archeological survey of certain islands of the Santa Barbara archipelago.

PROFESSOR HUTTON WEBSTER's "Primitive Secret Societies" has just appeared in a Japanese translation by Professor M. Tasaki, of Nagasaki, Japan.

DR. H. KLAATSCH, associate professor of anthropology at Breslau, died on January 7, at the age of fifty-two years.

DR. J. ALDEN MASON is completing a study of the Salinan language for the University of California.

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CHRONOLOGY OF THE TANO RUINS, NEW MEXICO¹

By N. C. NELSON

IN the course of archeological investigations pursued in New Mexico under the auspices of the American Museum during the past four years some chronological data have come to light which it seems proper to bring to the attention of students without further delay. The data consist mainly of observations on the stratigraphic relationship of several widely distributed types of pottery. Other facts of importance, such as architectural variation, exist, but these are less convincing and besides seldom immediately useful in determining the relative age of a ruin. This preliminary treatment is therefore deliberately confined to a presentation of the stratigraphy, together with a brief outline of the distinguishable ceramic features and the application of the results thus obtained to the ruins in the limited area under investigation.

GENERAL CONSIDERATIONS

As is well known, there are in the Southwest several more or less localized types of prehistoric pottery, such as ornamentally indented coiled ware, several distinct varieties of painted wares, and likewise, a somewhat varied group of glazed ware. Dr. J. W. Fewkes has only recently made us acquainted with another hitherto

¹ This article is a preliminary report of one phase of the systematic archeological exploration and excavation in the Rio Grande valley undertaken in 1912 by the Department of Anthropology of the American Museum of Natural History.

little-known ceramic type¹ of a unique character which was most intensively developed in the Mimbres valley but which occurs also in the adjacent Rio Grande country and probably beyond, towards the Pecos river. This fine, relatively ancient ware is of the painted order and seems to mark the southeastern limits of Pueblo culture in the United States.

To the north of the Mimbres center, extending up the Rio Grande drainage basin almost to the Colorado boundary, is another ceramic area characterized primarily by glazed pottery. The eastern limit of this area is somewhat uncertain, but it appears not to extend beyond the longitude of the lower Pecos and Red rivers, while in the west it remains within the Rio Grande basin except for a slender arm extended by way of Laguna and Acoma to the Zuñi valley where it again expands, taking in the country drained by several tributaries of the Little Colorado, close to the Arizona-New Mexico boundary. Leaving out of account probable sporadic occurrences in the Hopi country to the northwest, at Ysleta del Sur to the south, and also at reported minor sites along the Canadian river and elsewhere on the eastern plain, glazed pottery is distributed over an area approximating 20,000 square miles in extent, a stretch of territory which may be said to constitute the northeastern border section of Pueblo culture.

The greater portion of the country in question seems unfit for almost any sort of aboriginal existence, being either mountainous or desert-like plateau, lacking water. But the flood-plain of the Rio Grande and some of its tributaries, likewise the lower levels of the high relief with its springs and small patches of tillable soil offered inducements to a sedentary agricultural people. There is hardly a suitable spot that does not show some trace of former Indian life. To be sure, many of the settlements were small and perhaps temporary. But, disregarding those sites, there are on record for the region about three hundred ruins, some of them very large. Judging from results obtained in the Tano district alone, it is safe to say that a thorough-going examination of the entire

¹ "Archeology of the Lower Mimbres Valley, N. M." (*Smithsonian Miscellaneous Collections*, Vol. 63, No. 10, Washington, 1914.)

glazed pottery area would reveal probably twice the listed number of abandoned pueblos. The situation thus developed, area and environment being taken into consideration, becomes analogous to that observed in parts of California and in the Mound Builder area. That is, the implied population mounts to figures out of proportion on the one hand, to the productivity of the country and on the other, to the historically known facts. We may, therefore, reasonably suspect a lengthy occupation by either a shifting or a changing population; in other words, that the ruins in question are not of the same age.

Hitherto no archeological work of consequence has been done within the limits of the glazed pottery area, except in the north-western part of it, *i. e.*, in the Pajarito plateau district, where Dr. E. L. Hewett and his associates of the Archaeological Institute of America have been engaged for some years. However, the conditions here do not seem thus far to have yielded precise chronological information. At the same time it is only fair to state that it has been more or less apparent to every student since Bandelier made his first observations that the Rio Grande Pueblos underwent certain cultural transformations in prehistoric times.¹ In the region under investigation by the American Museum, a district which lies southeast of the Pajarito plateau and somewhat central in the glazed pottery area, this fact was evident from the beginning. Thus, traces of "small-house" ruins marked by sherds of painted pottery of the black-on-white variety, as well as by coiled ware, were found in several places during the reconnaissance and it was easy to see that these sites antedated the large Tano ruins, say of the Galisteo basin, which were characterized chiefly by glazed pottery. At the end of the first season's work one of these glazed types of pottery had been eliminated as of historic date, having been found constantly associated with bones of the horse and other domestic animals and in fact only in particular sections of such

¹ Since the above was written Dr. A. V. Kidder has published his paper entitled: "Pottery of the Pajarito Plateau and of Some Adjacent Regions in New Mexico," *Mem. Am. Anthropol. Assoc.*, Vol. II, Pt. 6, 1915, in which he characterizes four styles of pottery and tentatively places the same in chronological order.

pueblos as San Cristobal, San Lazaro, San Marcos, Galisteo, and San Pedro Viejo, all but the last of which were known as Mission centers down to about 1680. But there were still apparently at least two distinguishable types—with several variants—of glazed pottery, the relative ages of which could only be surmised because both occurred in association with the strictly historic ware, though not with the same frequency. As no actual excavation was undertaken during 1913, nothing further was accomplished until 1914, when the importance of the subject had fairly impressed itself. By the opening of the season it was reasonably certain, both from internal evidence and from various general considerations, what was the chronological order of the four apparent pottery types, but tangible proof was still wanting.

This desideratum, as it happened, was obtained at the first site excavated, viz., San Pedro Viejo or Paako, a pueblo ruin lying on the southwestern edge of the Tano territory, near the head of the valley separating the San Pedro and Sandia mountains. Later, these findings were verified and supplemented by data obtained from a refuse deposit at Pueblo San Cristobal on the east-central border of the Tano country, *i. e.*, at the west base of the Trans-Pecos highlands, about seven miles south of Lamy. Again in 1915, verifications were made at the abandoned pueblos known as San Marcos, Cieneguilla, and Arroyo Hondo or Kuakaa, these last sites being all well toward the northern and northeastern limits of the Tano range and not far from Santa Fé. The result of these observations is the identification and chronological order of four, or practically five, successive styles of pottery corresponding to as many periods or stages in the history of the people occupying the late Tano and adjacent Pueblo territory. What follows is intended merely as a brief outline of the facts in the case.

STATISTICAL DATA

The data required to establish a chronology were of course to be looked for only in those places that bore evidence of long settlement. Actually superposed successions of ruins or large stratified refuse deposits are not as common, however, as might be expected, and

where they do occur, there is often no appreciable differentiation in the remains. Nevertheless, at San Pedro Viejo two superpositions were discovered, one showing contact of the historic type of glazed pottery with another earlier type of glazed ware, and the other showing contact of the older of the two preceding glazed types with the black-on-white painted ware. These were, however, merely clean-cut superpositions showing nothing but time relations. Towards the end of the 1915 season another case of contact similar to the last of the two mentioned above was found at Pueblo Kuakaa. But, as before, these sections, being incomplete in that they showed no trace of the fourth type of glazed ware, could not be taken at face value. That is to say, while the positions of the two extreme members of the pottery type series were fixed, the chronological order of the two middle members was not proved, though strongly suggested. However, at Pueblo San Marcos and also at Pueblo Cieneguilla, both in the ruins proper and in the refuse heaps, the ancient type of glazed ware twice noticed in contact with the black-on-white ware was found actually mixed with it, the one gradually replacing the other. This latter was the evidence wanted, because it accounted for the otherwise unknown time interval that separated the merely superposed occurrences of types and from the point of view of the merely physical relationship of contiguity, connected them. The remaining fourth type of pottery could now take only one position in the series, namely, that of third, counting from the bottom. But all these various superpositional and transitional sections are incomplete and fragmentary, each showing merely the time relations of two successive pottery types at some place or other in the total series of four or five types. Hitherto no complete section has been found, and probably does not exist unless possibly it be at Pueblo Pecos. This site, according to Bandelier, shows evidence of settlement in the days of black-on-white pottery and, as is well known, was inhabited down to about 1838.¹ The Tano section that comes nearest to filling the require-

¹ Since the above was written Dr. A. V. Kidder of the Andover-Pecos Expedition began work at Pecos and, if I understand the situation correctly, he has found a complete chronological section which tallies quite closely with observations in the Tano district.

ments was found at Pueblo San Cristobal. Here are to be seen the dwindling remains of a large refuse heap, still measuring about ten feet in depth on the vertical exposure in the bank of the creek

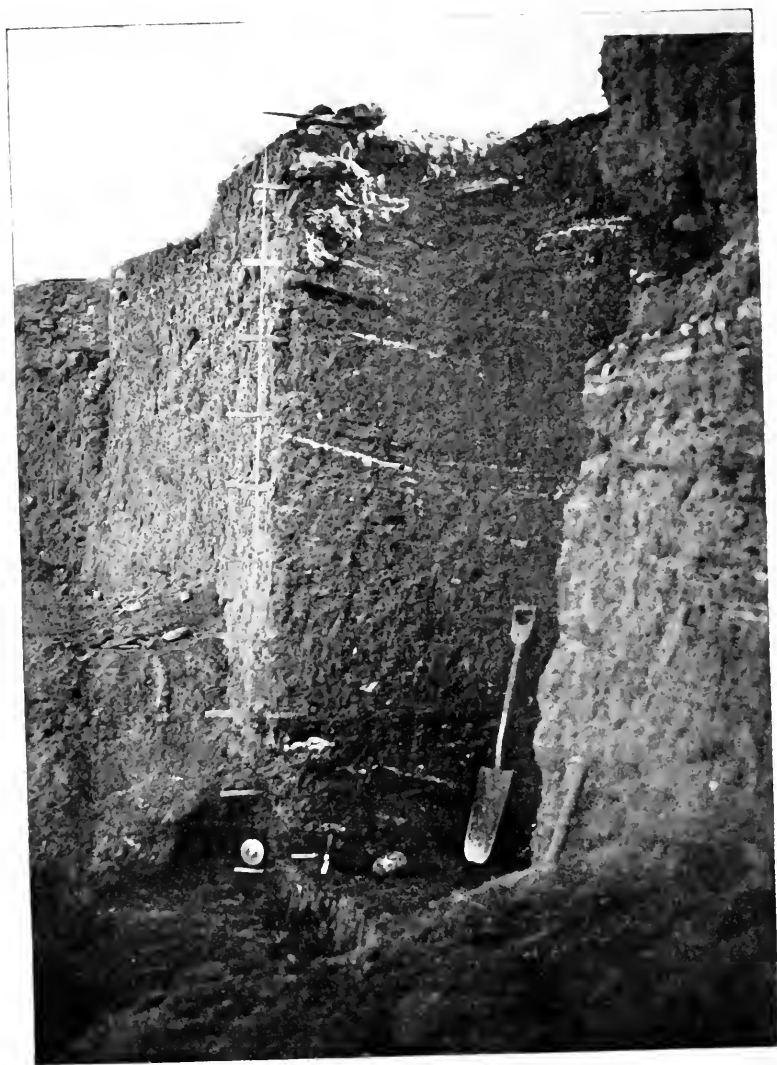


FIG. 20.—The San Cristobal refuse section, 9 ft. 8 in. thick, yielding three successive types of pottery. Note skull protruding from original surface soil.

which has undercut and carried away the missing part (see fig. 20).¹ Human burials were visible at different levels of this débris when first seen in 1912, and in order to obtain some skeletal material a five-foot bench was excavated from one side of the artificial deposit to the other, along the edge of the creek. At that time it was noticed in a general way that different types of pottery fragments prevailed at different levels but no effort was made, until too late, to keep them separate. This happened partly because I was not continually present during excavation, having decided beforehand that chronological data were to be obtained in the ruins only and not in burial mounds where grave diggers in overturning the débris again and again had surely destroyed the planes of stratification. But as all data from the ruins remained inconclusive after practically three seasons' work I returned to San Cristobal in 1914 to make a test. A visibly stratified section of the refuse exposure showing no evidence of disturbance was selected and a block of this measuring 3 by 6 feet on the horizontal and nearly 10 feet deep was excavated. I performed this work with my own hands, devoting fully three days to the task. The potsherds from each separate foot of débris were kept apart and the finally classified numerical results appear in the following table.

This test is not perhaps all that could be desired; but inasmuch as its results in their general bearings agree absolutely with the partial data obtained before and since at other sites, no effort has been made to strengthen the inevitable conclusions. Had a greater volume of débris been handled, the figures of the table might possibly have lined up a little better and possibly not, because a larger block of débris would doubtless have included areas disturbed by burials, etc. Even with the conditions as given, viz., a visibly stratified and undisturbed block of deposit, accidents are entirely probable and no stress should be laid on individual figures, which at best are more or less arbitrary. The table as a whole is, however, both consistent and intelligible.

¹ For a larger general view of the refuse deposit, its relation to the topography and adjacent ruins, see also Pl. I. of my descriptive report entitled "Pueblo Ruins of the Galisteo Basin." (*Anthropological Papers, American Museum of Natural History*, vol. XV, pt. 1, 1914.)

Thickness of Section	Corrugated Ware	Biscuit Ware	Type I, Two, and Three Color Painted Ware	Type II, Two Color Glazed Ware			Type III, Three Color Glazed Ware
			Black-on-White Painted Ware	Red Ware, Black or Brown Glaze	Yellow Ware, Black or Brown Glaze	Gray Ware, Black or Brown Glaze	Gray, Yellow, Pink and Reddish Wares, Combination Glaze-and-Paint Design
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1st. ft.	57	10	2	24	23	34	5
2d "	116	17	2	64	90	76	6
3d "	27	2	10	68	18	48	3
4th "	28	4	6	52	20	21	
5th "	60	15	2	128	55	85	
6th "	75	21	8	192	53	52	1 ?
7th "	53	10	40	91	20	15	
8th "	56	2	118	45	1	5	
9th "	93	1 ?	107	3			
10th "	84	1 ?	69				
= 8 in.	(126)		(103)				

Examining the table as it stands, we see at once that column 1 has no chronological significance, corrugated cooking pottery of essentially the same style having been in use throughout the time period represented by the ten-foot accumulation of débris. Column 2, likewise, is relatively useless for chronological purposes because the so-called "biscuit ware" indicated by it runs a rather unsteady course from beginning to end. The rest of the table is as satisfactory as could well be expected, whether we study the columns as individual or as related units. Column 3, representing black-on-white painted ware—called Type I—has its maximum expansion at the bottom and becomes negligible about halfway towards the top. The few fragments found in the upper four feet indicate probably heirloom vessels held over from early days or else specimens dug out of the ruins and not at all that this type of ware continued to be manufactured.¹ Whatever historical significance attaches to the fact that the ware was at its maximum development when the refuse began to accumulate we must leave for later consideration. The 4th, 5th, and 6th columns, representing contemporary variants of early glazed ware—called Type II—show

¹ The figures 69 and (103) in the 10th foot of Column 3 may need explanation. This 10th foot of débris in actuality measured only 8 inches in thickness and contained 69 potsherds. Had the débris measured a full 12 inches it should have contained about 103 potsherds. This will also explain the lower figures in Column I.

very nearly normal frequency curves. That is, the style of pottery indicated came slowly into vogue, attained a maximum and began a gradual decline. At the point where the maximum is reached the preceding style will be noticed to have come to practical extinction. Column 7, standing for a ware combining painted and glazed ornamentation—called Type III—barely gets a showing; but it appears to make the proper start for another normal frequency curve, such as would be expected. This curve might doubtless have been completed by excavation in other refuse heaps of later date than the one here tried. As no such supplementary test was made the succeeding style of glazed pottery called Type IV, and referred to already as of historic date, cannot appear at all in this statistical way. Its position in the chronological type series is, however, fixed by an abundance of sound evidence. Finally, there may be mentioned, as Type V, a painted style of ware which is clearly the forerunner of modern Pueblo pottery, though it takes its start prior to 1680. This particular ware does not seem to occur at San Cristobal or in any but the westernmost of the supposed Tano ruins and is therefore perhaps of Keresan origin. With these few remarks we may leave the statistical aspect of the table to speak for itself and turn our attention to its pottery classification.

DESCRIPTION AND CLASSIFICATION OF POTTERY

As will readily be perceived, the validity of the numerical data set forth in the preceding table depends upon the classification of the pottery. In attempting this the same difficulty arose that confronts the student in dealing with any other series of related phenomena: there were overlappings and minor variations that for the sake of simplicity had to be ignored. Consequently, the separation of the Tano pottery into nine stylistic groups—seven of which appear in the table—is only an approximation to the actual facts. Future study of the ceramics is sure to compel further subdivision. But the basic characters here seized upon, are sufficiently distinct to warrant the classification as far as it goes; to have noticed minor variations would not have affected one way or the other the chronology to be established. The leading superficial characters of

most of the ceramic styles are indicated at the head of each column of the table and are also partially illustrated in fig. 21 and pl. VII. Those styles or contemporary varieties of styles that mark successive time periods have been named "Types." In part this terminology is no doubt arbitrary, but it will serve present purposes. Finally, it must be stated that in attempting the following comprehensive description of the pottery it was found necessary to consult the material dug out of the ruins as well as that obtained from the refuse heaps.

Corrugated or Coiled Ware (Column 1 of Table).—This ware is almost invariably covered with soot and was evidently made exclusively for cooking purposes. Hence, it naturally shows no such finesse of technique as is found to characterize the coiled ware outside the glazed pottery area. The ware ranges evenly from top to bottom of the refuse heap and occurs at all Tano ruins from the earliest to the latest; but as it undergoes no appreciable modifications in form, finish, or composition it must be left out of account for the present as chronological data. The leading characters of the ware are as follows:—

1. *Form, Size, etc.*—Normally a jar (olla), spherical body, short neck, flaring rim; occasional shoe or bird-shaped pots with knobs suggesting wings and tails; bowls uncertain. Sizes range from miniature to medium, approaching large.

2. *Surface Finish.*—Plain coil of primary and sometimes apparently secondary origin; indented coil (finger, finger-nail or sharp implement being used) with occasional effort at ornamental effect. Coiling and indenting often obscured either by wear or by "wiping" during process of manufacture. Some specimens of later times show evidence of a micaceous wash.

3. *Paste Composition.*—Gray colored clay, more or less tempered with coarse sand or crushed rock of crystalline nature. In early times some crushed pumice stone may have been added, while in later times micaceous substance was occasionally mixed in. Vessel walls are thin and brittle, the latter fact being due probably to constant use over the fire.

Biscuit Ware (Column 2 of Table).—This peculiar kind of pottery, which can be detected even by the touch, may or may not be a lineal descendant of the local black-on-white painted ware that precedes it (see Column 3 of Table). At any rate, it is the only

¹ For additional illustrations of several of these pottery styles, the student should consult Dr. Kidder's paper already cited.

style of painted pottery to maintain its vogue side by side with glazed ceramics from the beginning to the end of the latter's existence. There seem to be two kinds of biscuit ware, the most common being of a dull white or light gray color, the other of a dull yellowish tone. This latter has its probable forerunner in a more or less distinguishable variety of the black-on-white ware, but the prototype of the former has not been found thus far. Judging from both the time and space distribution of the typical biscuit ware, it seems probable that this was not manufactured by the Tano themselves, but was secured by trade either from the Keres or the Tewa in whose old territory it is very abundant. The most common ware exhibits the following characters:—

1. *Form*.—Bowls, often asymmetrical, hemispherical body with slight constriction near the top and a more or less flaring rim; with or without a flattened edge—approaching right-hand illustrations under Types I and II, fig. 21. Vessel walls unusually thick. Sizes range from small through medium towards large.

2. *Surface Finish*.—More or less smoothly polished, with and without an exceedingly thin wash of the paste material, in colors ranging from dull white to gray, depending on length and nature of use.

4. *Ornamentation*.—Geometric design on one or both sides, more or less crudely executed, in dull black paint. Rim edge sometimes dotted. Awanyu symbol common.

5. *Paste Composition*.—Homogeneous, finely granulated, light in weight, soft and porous, lacking cohesive strength. Tempering material practically absent, though occasional quartz-like crystals occur. The composition suggests nothing so much as ground-up pumice stone or volcanic tufa, a substance which is so very abundant in the Pajarito region where biscuit ware is most plentiful.

We come now to the type series of the pottery which establishes the chronological relations of the Tano ruins. Before proceeding to the description of these types special attention is directed to fig. 21, giving illustrations of the gradual specialization of the rim sections of the bowls.

Type I

Two and Three-Color Painted Ware (Column 3 of Table).—The pottery actually figuring in the table is a local variety of the black-on-white ceramics commonly identified with the generalized sub-

TYPE IV

GRAY WARE, GREENISH GLAZE. HISTORIC.
TWO-COLOR



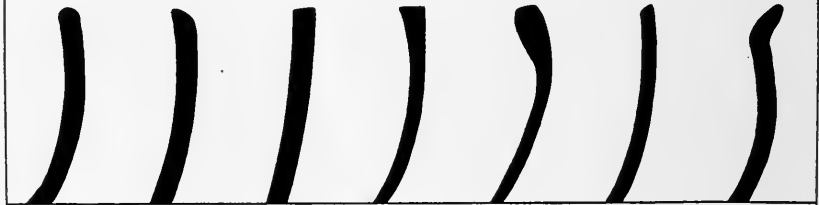
TYPE III

COMBINATION GLAZED-AND-PAINTED WARE.
THREE-COLOR



TYPE II

RED, YELLOW AND GRAY WARES, GLAZED.
TWO-COLOR



TYPE I

BLACK-AND-WHITE PAINTED WARE. ANCIENT.
TWO AND THREE-COLOR



FIG. 21.—Typical rim sections of Tano pottery, only bowls being represented. The very gradual specialization suggests genetic relationship.

stratum of Southwestern Pueblo culture.¹ Bandelier generally associated the ware with "small houses," *i. e.*, with what might be called a pre-Pueblo stage of sedentary life; but the data now at hand enable us to state that the large quadrangular form of village typical of the Rio Grande valley in later times was fully developed before the black-on-white pottery went out of style. The ware as a whole is perhaps not quite so fine as that of the Mesa Verde and Chaco regions on the one hand or of the Upper Gila and Mimbres regions on the other. It is particularly lacking in variety of form. In decorative symbolism it approaches the abandoned northwestern Pueblo area rather more than the southwestern and is little, if at all, inferior to it. The characterization of the ware follows.

1. *Form, Size, etc.*—Bowls predominate; ladles, *i. e.*, bowls, with handles, occur; jars very rare. Body form of bowls hemispherical. Rim section almost invariably plain, with top edge flat, rounded or pointed; occasional flaring lip (see Type I, fig. 21). Bowls come in small and medium sizes, vessel walls uniformly rather thin. Jars are miniature and medium.

2. *Surface Finish.*—Some bowls show trace of coiling or of basket mould on the outside. Surface rubbed more or less smooth on one or both sides. Slip or wash on one or both sides (often crackled) in colors—like the paste—ranging from dull white to blue-gray, depending on length and nature of use.

3. *Ornamentation.*—Applied inside of vessel (very seldom outside), rather skillfully, in black paint. Design geometric, rectilinear and curvilinear; hachure work and bands of thin parallel lines common; occasional pieces with paint dots on edge of rim as in Mesa Verde ware.

4. *Paste Composition.*—Variable on close examination. Matrix always of a grayish color, sometimes almost white with a bluish tinge (color of wood ashes), fine grained, closely knit, hard, and firm. Tempering material varies. Sand or crushed rock of a crystalline nature occurs in some pieces, but crushed basalt is more common. Sometimes the two are mixed and both may be nearly absent, as in the apparent prototype of biscuit ware.

Attention must be called at this time to the fact that an exceedingly small percentage of a black-on-red painted ware is generally mixed with the black-on-white, as is the case in the Chaco, Mesa Verde, and other districts. Thus far only bowl fragments have been found. These show a gray colored paste, red slip on

¹ There is some reason for believing that black-on-white ware in the Tano district has a local prototype not associable with Pueblo culture, but of this more at some future time.

both sides, geometric design in black on the inside, and sometimes a design in white on the outside. The ware is of a decidedly pleasing appearance and is probably a forerunner of the most prominent variant of the next type of ceramics to be considered.

Type II

Two-color Glazed Ware (Cols. 4, 5, 6 of Table).—As indicated in the table this ware comes in three distinct varieties of color—red, yellow, and gray—with ornamentation done in black or brown glaze. There are, however, several reasons besides brevity of treatment for grouping the three kinds of pottery under one and the same heading. Thus the variants to be described all bear some resemblance to the preceding type, they have in addition a number of common characters, and they are practically contemporary. Individually considered, the red ware seems to have arrived first—in fact it was probably the transition form, while yellow and gray wares held out the longest and gave rise no doubt to the succeeding type. At first sight the shift of types seems rather violent. For ages black-on-white and black-on-red wares had been in vogue and now we find the black-on-white replaced by black-on-gray and black-on-yellow wares, the black-on-red only having held over.¹ More striking still is the fact that ornamentation is now applied with glaze instead of paint. Nevertheless, there are indications enough to suggest that the transition from Type I to Type II was not very sudden in any sense of the word (see *e. g.* rim section in fig. 21); but as yet details on this point await investigation. The outstanding characters of the ware are as follows:—

1. *Form, Size, etc.*—Bowls predominate but jars occur, the former in sizes varying from small through medium towards large, the latter from miniature towards large. (A) Bowl bodies are hemispherical as in Type I. Rim sections mostly plain, but a few are swelled or show inward or outward curve (see Type II, fig. 21). (B) Jars have more or less vertically compressed bodies; round bottoms, wide mouth, with or without neck, with or without flaring lip. The miniature forms have short bottle necks and have two loop-handles set on the body near the neck.

¹ This black-on-red glazed ware is identical with Dr. Kidder's "Schoolhouse" pottery.

2. *Surface Finish*.—Smoothed by rubbing on one or both sides. Slip applied on one or both sides (extra thick on ornamented side), in red, yellow, and gray color, the same color covering the entire vessel.

3. *Ornamentation*.—Applied on upper half of jars and on inside of bowls (seldom outside) in the form of glaze of a color ranging from greenish-brown to black, depending to some extent on its thickness and also on color of slip beneath. Glaze sometimes crackled. In some cases the ornamental substance is of a consistency halfway between glaze and paint, in others it is a genuinely *vitrified* coating, resisting a knife point, and every bit equal to the glaze on modern crockery. Design is geometric, executed with an effort at precision but somewhat simplified in comparison with Type I, the component parts being generally done in much heavier lines than in the painted ware, because the glaze had a tendency to run and thus to spoil all attempts at a fine-line pattern. Symbolism partly the same as in Type I, partly different. Some conventionalized bird figures occur on later developments of the ware.

4. *Paste Composition*.—Resembles Type I sometimes but in general is less hard and firm, also lighter in weight. The tempering material has less of basalt and more of sand. Color of matrix varies greatly, depending evidently not on nature of clay used but on color of slip applied to vessel. Often it is gray in the center as in Type I, *e. g.*, and red near the exteriors; but in other cases it is red clear through as if coloring matter had been mixed into the paste. There is of course, also, the occasional possibility of the red color being due to oxides in the clay.

Type III

Three-color Glazed Ware (Col. 7 of Table).—The distinguishing feature of this type of pottery is that its design element, or part of it, is outlined in glaze and filled in usually with red paint, the combination design being placed on a ground color or slip of a different order such as yellow, pink, gray, and even some shade of red. This ware, while not well represented in the Table for the San Cristobal refuse heap, is diffused apparently over the entire glazed pottery area and is especially abundant in the large Tano ruins. It was in use for some time after the Spaniards came to New Mexico but is nevertheless essentially of prehistoric date. The ware is doubtless a descendant or a development with modifications, good and bad, from the preceding type, though the detailed proof of this statement remains to be worked out. But while the new type of ceramics has gained in diversity of form and general adaptability, it has lost not a little in decorative elegance. Its main characters may be summed up as follows:—

1. *Form, Size, etc.*—Bowls and jars are about equally abundant and both occur in sizes ranging from small through medium towards large. There are also a few vessels of the jug type with combination spout-handle, resembling the common Peruvian specimens of that order. Vessel walls are a little thicker than formerly but show some range. (A) Bowl bodies hemispherical. Rim sections decidedly varied in thickness and curve (see fig. 21). (B) Jar bodies more or less vertically compressed, often slightly asymmetrical, bottoms round (jars from the Keresan territory have flat or punched up bottoms), mouths wide, necks vertical or contracting, lips absent or flaring.

2. *Surface Finish.*—Rubbed smooth on one or both sides, except on inside of jugs where coiling is often left undisturbed. Two different-colored slips were generally applied to different parts of the vessel. Thus in the case of a bowl the outside bottom—the part invisible when placed right-side up—was usually painted red while the rest of the surface, inside and out, received a slip of some light shade of yellow, gray, pink or even red, which served as background for the ornamental design. In the case of a jar the lower half of the body and the inside visible portion of the neck was generally (not always) painted red while the outside of the neck and the upper half of the body received a slip in one of the several colors enumerated above, and which here also served as background for decoration.

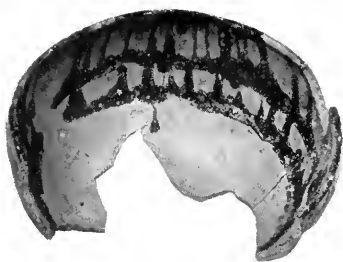
3. *Ornamentation.*—Applied as already indicated on the outside of the neck and upper part of the body of jars and on the inside as well as on the upper outside portion of the bowls, partly with glaze and partly with paint, the latter usually red. Exceptions occur where no ornament has been added on the outside of bowls or on the neck of jars. The characterizing feature of this pottery type, *viz.*, the ornamental figures outlined with glaze and filled in with red paint, are generally confined to the neck portion of the jars and to the outside of the bowls; but sometimes the combination design does occur also on the body portion of a jar as well as on the inside of a bowl (see pl. VII), in which case the outside of the bowl is usually left blank or is merely marked by a few dashes of plain glaze. Designs mostly geometric as before, more or less crudely executed, and in part spoiled by the glaze running beyond its intended limits; quite a number of conventionalized bird figures; some more or less realistic bird figures, mammal figures, etc.¹

4. *Paste Compositions.*—Not so uniform as to be a leading character by which to identify the ware. Some of the paste is like that most common in preceding types; but in general it is more porous and brittle than formerly. The colors range through various shades of brown, red, and gray; sometimes red with a gray core, resembling the gray of previous types. The tempering material varies much in nature and quantity, fine sand, coarse sand, or crushed rock, varicolored granules of uncertain nature—perhaps crushed potsherds, etc., being used.

Accompanying the mass of type ware are a few specimens

¹ See Dr. Kidder, *op. cit.*, for illustration.

Type IV



Type III



Type II



Type I



ILLUSTRATIONS OF THE FIRST FOUR TYPES OF TANO POTTERY

probably of contemporary date which except for general crudeness of finish might be regarded as two-color ware of the preceding type. These are mostly miniature and small vessels of the "prayer bowl" variety, rectangular in outline, flattened bottom, more or less vertical sides, usually painted red, decorated with a few dashes of glaze and in one instance with a semi-realistic bird figure.

Type IV

Historic Two-color Glazed Ware.—This style of pottery, though very short-lived, has been singled out as a chronologic type because it is strictly characteristic of those ruined Tano pueblos that were inhabited between 1540 and 1680. It has been found also in ruins whose historic occupancy is not a matter of record, *e. g.*, at Pueblo Tunque; but here as elsewhere, the ware occurred in association with bones of domestic animals, fragments of copper, iron, porcelain, etc., and never under any other condition. The characterizing peculiarities of this pottery are its diversity of forms and its simplified but execrable decoration. In other words, the ware, while somewhat specialized and perhaps more adaptable to use, is far less artistic than formerly for the reason principally that it is not genuine Indian art but a poor European imitation. It represents the breakdown of Pueblo culture under the first century of stringent Spanish régime. The detail features of the ware may be summed as follows:—

1. *Form, Size, etc.*—Bowls, jars, platters of various odd outlines, cups or mugs with loop-handles, melon-shaped vessels, rectangular vessels, etc. Sizes range from miniature towards large. Thickness of vessel walls have considerable range. (A) Jars have more or less vertically compressed body, often somewhat angular in outline, round or flattened bottom, wide mouth, no neck as a rule, with or without flaring lip (see fig. 21). (B) Bowls show hemispherical body, convex bottom. Rim exceedingly varied in thickness and disposition, being either vertical, incurving or outcurving; lip absent or outflaring (see fig. 21).

2. *Surface Finish.*—Decidedly varied, some red ware being polished to a high degree like modern Santa Clara black pottery, some rubbed to an average degree of smoothness as formerly, and some merely scraped but not smoothed at all. A slip appears on most (not all) of the ware, usually in a gray color, sometimes yellow or cream color and occasionally red.

3. *Ornamentation.*—Applied as before on one or both sides of a bowl and on

the upper portion of the body of a jar, in the form of glaze. The color and general appearance of this glaze is a very characteristic dark brown when thickly applied and of a greenish hue when the coating is thin. Generally the iridescent glaze substance is of such striking and excellent quality as to incline one to the opinion that it was compounded after a Spanish formula. The fact that the artist could not control it at all seems suggestive of the same idea. The designs attempted, though of the very simplest geometric nature, were almost invariably ruined by the running of the glaze (see pl. VII).

4. *Paste Composition*.—Varies but slightly from preceding type, but there are exceptions of closely knit, hard and firm matrix. Normally the paste is porous and brittle. Tempering material either coarse or fine crystalline. Colors are brick red, reddish, brownish, and gray.

Type V

Modern Painted Pottery.—Whether the Tano potter actually revolted against the degenerative tendency of his art during the first three-fourths of the seventeenth century, or whether his more advanced and at the same time more conservative Keresan neighbor came to his assistance is uncertain. But the fact remains that some time prior to the Rebellion of 1680, painted pottery of a decidedly modern stamp began to replace the glazed ware at the village of San Marcos, and to a slight extent elsewhere. At Cienega and Cieneguilla the painted pottery occurs in such profusion, and with no admixture of glazed ware, as to lead one to conclude that these settlements were of post-Rebellion times, though history is silent on the subject. Now it happens that ware of this sort is found in considerable abundance at the ruins of Pueblo Kotyiti (excavated 1912) and also at the nearby ruins of Pueblo Kuapa of earlier date in the Keres country to the west of the Rio Grande. In the Tano ruins of pre-Rebellion times it is scarce, however, and may not occur in quantity except at San Marcos. For this reason we may dismiss it for the present with a few delineatory remarks.

The material at hand for the Tano ruins consists of but a few fragments and it will therefore be impossible to go into any details. Bowls and jars both occur, possibly also other forms. Seemingly there are no more vertical jar rims, but the bowl rims show at least several of the former variations. Vessel surfaces are more or less well rubbed. The undecorated portions of the ware—bottoms, etc.

—are generally painted red, the other portions ordinarily a light pink. The ornamentation, placed on this pinkish ground-color, is done with black paint. Sometimes the figures are merely outlined with black paint and filled in with red paint, as in Type III. The decorative lines are generally thin, straight or curved and done with only a fair amount of precision. All designs are geometric, with some few of a semifloral nature. The vessel walls are rather thicker than formerly. The paste is of light weight, porous, and brittle, containing a good deal of sand. Its color ranges between red and dull yellow, the latter resembling at times the color of unburned adobe.

SUMMARY

The present paper is, of course, not a study of Tano ceramics but merely an attempt to establish the basis for a chronology. To that end the principal styles of pottery have been described in more or less tedious detail chiefly to convince the student that the differences, particularly of the so-called successive types, are real and not imaginary. Only the grand divisions, peculiar not to the Tano district but in a measure to the whole glazed pottery area, have been considered and merely from a concrete or objective point of view. Subdivisions of styles, such as "Frijolitan" and "Standard Pajaritan" suggested by Dr. Kidder probably exist also in Tano ceramics. At any rate transition material is present. But these are matters for future discussion.

The principal difficulty in making the classification has been to devise a terminology that shall be readily intelligible and also simple enough to be permanently useful. Both archeology and geology suffer confusion by the use of geographic words that are meaningless without an appended definition. For that reason I have avoided repeating Dr. Kidder's terms such as "Schoolhouse," "Frijolitan," "Pajaritan," etc., though the latter two are both convenient and expressive and may for all I know be desirable labels for local modifications of a particular type of glazed pottery. On the other hand, a terminology that is self-explanatory is necessarily clumsy. Still, for the present, I see no scheme more convenient in the prose-

cution of my own work than the preceding classification which may here be summarized.

Type I. Two and Three Color Painted Wares.

1. Black-on-white.
2. Black-on-red.
3. Black-and-white-on-red.

Type II. Two Color Glazed Wares.

1. Black-(or brown)-on-red.
2. Black-(or brown)-on-yellow.
3. Black-(or brown)-on-gray.

Type III. Three Color Glazed and Painted Wares.

1. Black-glaze-and-red-paint-on-gray.
2. Black-glaze-and-red-paint-on-yellow.
3. Black-glaze-and-red-paint-on-pink.
4. Black-glaze-and-red-paint-on-red.

Type IV. Historic Two Color Glazed Wares.

1. Brown-(or green)-on-gray.
2. Brown-(or green)-on-red.
3. Brown-(or green)-on-yellow.

Type V. Modern Painted Wares.

1. Black-on-pink.
2. Black-and-red-on-pink.

The above types of pottery succeed each other in the order given; but accompanying them from beginning to end, without undergoing any marked changes are two additional types, viz.:

1. Corrugated or coiled ware.
2. Biscuit ware (*i. e.*, a surviving variety of black-on-white ware).

APPLICATION OF CHRONOLOGICAL DATA TO THE TANO RUINS

Accepting the foregoing chronological deduction as essentially correct, we may properly conclude this study by trying out our scheme on some of the ruins in the territory to which it applies. A limited amount of data in the way of potsherds, etc., is available for several subdivisions of the glazed pottery area and judging from these it seems probable that the entire region underwent about the

RUINS OF THE TANO DISTRICT, NEW MEXICO

No.	Name of Locality	Pre-Pueblo Period	Pueblo Periods					No. of Rooms Excavated	
			I	II	III	IV (1540-1680)	V (1680 on)		
1	White Rock Cañon, No. 1		×	×					
2	" " " " 2		×	×					
3	Boom Camp		×	×					
4	Los Aguajes			×	×			33 +	
5	Santa Fé		×						
6	Agua Fria, No. 1		×						
7	" " " 2		×	×					
8	Cieneguilla		×	×	×		×	132	
9	Cienega, No. 1						×		
10	" " " 2			×					
11	" " " 3		×					45	
12	" " " 4	×						Trenched	
13	La Bajada, " 1		×						
14	" " " 2			×	×			84 +	
15	Canyoncito, " 1			?	×			9 +	
16	" " " 2				×				
17	" " " 3		×						
18	" " " 4	×							
19	Arroyo Hondo, " 1		×					12	
20	" " " 2		×	×				108 +	
21	Peñas Negras		×						
22	Chamisalocita Cañon		×					44 +	
23	Alamo Cañon		×					27 +	
24	Mansanaria, " 1		×					Trenched	
25	" " " 2		×					5 +	
26	Lamy " 1		×						
27	" " " 2		×					2	
28	" " " 3		×					17	
29	San Marcos		×	×	×	×	×	172 +	
30	Cañon Casita		×						
31	San Cristobal		×	×	×	×	?	239 +	
32	Largo			×	×			13 +	
33	Colorado			×	×			47 +	
34	Shé		×	×	×			28 +	
35	Blanco		×	×	×			47 +	
36	San Lazaro		×	×	×	×	?	60 +	
37	Galisteo		×	×	×	×	?	25 +	
38	Gipuy (Old Domingo)			×	×				
39	Ojito Juan Pedro			×					
40	Pinavetitas Cañon				×				
41	San Pedro Viejo (2)	(X)	×	×	×	×	?	174 +	
42	Uña de Gato, No. 1		×						
43	" " " 2			?	×				
44	Tunque			×	×	×		239 +	
45	Algodones	×							
Totals			4	29	21	10	6	3	1562

same stylistic changes. But for present purposes it will be enough to illustrate the possibilities of chronological determination by applying the facts at hand to the Tano district from which alone our data are nearly complete. Substituting for the five successive pottery types a corresponding number of time periods we get the following results, set forth in tabular form.

The table must for the present be left to speak for itself. It is not complete in some respects and it may even be incorrect on two or three points; but the final report on the alignment of the Tano ruins will not differ very much from the indications above presented. Of particular interest is the steadily decreasing number of ruins marking the successive Pueblo periods, but until the capacities of the various ruined villages have been estimated it is useless to put definite constructions upon the figures. The offhand impression is, however, that the housing facilities during the first three periods of Pueblo history in the Tano district remained very nearly uniform because as the villages decreased in number they increased in size. This might mean among other things that the population remained fairly stable.

In conclusion it may be well to repeat that the foregoing attempt to establish a chronology is based on purely concrete and numerical data. It is a study largely of small fragments of pottery, their number, nature, and physical contact relations. But the case for chronology can be strengthened by the investigation of architectural modifications, although these at best cannot serve as a sound classificatory basis. Furthermore, when the very considerable quantities of crushed pottery vessels obtained during three seasons of excavation have been assembled and put in shape for comparative study it should be possible to observe either a series of sharp breaks in the symbolism on the pottery, or else a gradual development of motifs. Such a study it now seems probable will show that the successive styles of ceramics arose the one from the other and that therefore, by inference, we may assume a relatively steady and uneventful career for the people inhabiting the Tano territory.

NEW DATA ON THE TRENTON ARGILLITE CULTURE¹

By LESLIE SPIER

THIS paper presents new data relating to those finds at Trenton known to Abbott and Volk as the "argillite culture."

These investigators report that three distinct cultures are associated with three strata of the terrace south of Trenton, the remains of the Delaware Indians with the present surface soil, the "argillite culture" with the yellow loam immediately beneath, and a paleolithic culture with the gravels below the yellow loam. Our data are from the yellow loam.

Our excavations in the yellow loam at the Abbott farm yielded about two thousand specimens. We find but few forms of artifacts among these, pitless hammerstones, and chipped stone implements of the arrow point and large blade types. The remainder of the specimens are chips and fragments of various materials, fragments of bone, and fire fractured pebbles. In sharp contrast with these are the remains of the Delaware in the surface soil above: pottery, bone, shell, and copper implements, polished and engraved stone objects, notched and grooved sinkers, pitted and pitless hammerstones, and arrow points and larger chipped blades. Again, while only a limited number of arrow point forms are found in the yellow loam, the form of the Delaware points varies widely. We recognize then, in agreement with Volk, that we have here a simple culture set over against one that is relatively complex. The identity of the "argillite culture" is therefore not to be confused with any other.

Not only is the distinction between these cultures definite and sharp, but our preliminary study in this direction has yielded no evidence that the culture represented in the yellow loam is not

¹ Read before the American Anthropological Association at Washington, D. C., as a preliminary report on archeological explorations in New Jersey conducted by the American Museum of Natural History.

homogeneous. That is, we have found nothing that we may not refer to a single culture, nor have we found any differentiation in type corresponding to the vertical distribution of these artifacts.

Excavations at the Abbott farm were begun in 1914 by Mr. Alanson Skinner. Two series of specimens were removed by two methods. The first of these, the result of careful troweling, showed that specimens were to be found in quantities in the yellow loam, and a tabulation of their positions showed a suggestive vertical arrangement. The second series from extended shallow trenches showed that the specimens were distributed throughout the site within a few feet of the surface soil. This work suggested the following as immediate objects for the work of 1915 which was undertaken by the writer:—

1. To determine whether the artifacts lay in more than one plane of deposition.
2. To determine if the artifacts lay in groups.
3. To determine if the artifacts in the yellow soil were always found distributed vertically in a characteristic manner.
4. To determine the relation of the artifacts to certain geological features, (*a*) red bands, (*b*) pebbles.

For this purpose the trenches were extended, excavation being carried below the specimen-bearing region through a barren region one foot in depth. Trenching proceeded by two methods: the bulk of the material was removed in levels four inches in depth and sifted, while sections of particular interest were carefully sliced away with a trowel. The depth of each specimen was recorded from an arbitrarily established plane, the plane of contact of the surface soil with the yellow loam.

We note that the specimens, with few exceptions, lay flat or with their long axes horizontal. In size they ranged up to hammer-stones, and we note that no artifact was larger than the largest pebble or small boulder in the loam. The rarity of large artifacts and large boulders is strictly comparable.

We have indicated on the profile (fig. 22) the distribution of the specimens by figures representing the number of specimens found near the positions occupied by each figure. Beginning at the

western end, it will be noted that only isolated specimens were found in the first 180 feet, east of this the mass of the specimens lie in a single plane at a grade of 1.5 percent to 2.0 percent for the first 400 feet, and roughly parallel to the surface for the remaining distance. This plane lies from 12 to 18 inches below the surface. To these data we must add that of the work of 1914 in Trenches I and 2, which is in entire agreement. (These trenches lie beyond the crest of the slope and therefore not in the plane of the profile, but they are nevertheless indicated at II and I respectively.)

On further examination we find that specimens do not occur in all sections of this plane, but that they lie in groups with isolated specimens between. The distribution of the specimens comprising a group is exactly what might be expected as a corollary of this fact. Tabulating the recorded positions for one group shown at III on the profile, we find the distribution as shown in Table I.

These series are shown graphically in fig. 23. Here we note that the west-east arrangement is of the type found in chance groupings, a normal frequency distribution. On the other hand, the form of the north-south arrangement is not so

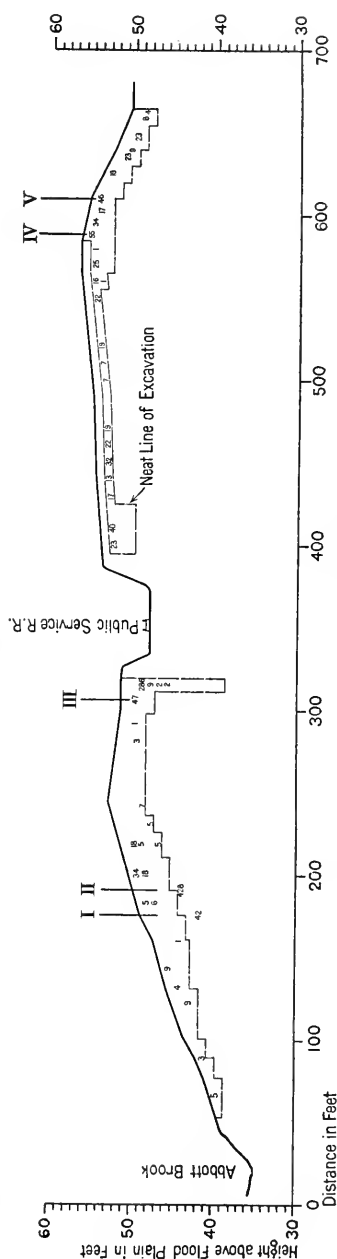


FIG. 22.—Profile of trenches B and C, looking north.

Frequency:	. . . . 20"	. . . . 15"	. . . . 10"	. . . . 5"	. . . . 0"
Bone	2 1 2 1 2	. 3 1 2	10 . . 3	3 3 3 1 5	. 2 3 .
Artifacts	. . . 1 1	. 1 . .	. . . 1	1 . . 1	1 1 . . 1
<i>Total</i>	2 1 2 2 3	0 4 1 2 0	10 0 0 4 0	4 3 3 2 5	1 3 3 0 1

Again in this series we find that the arrangement is that of a normal frequency distribution.

Turning to the vertical arrangement of specimens in these groups we find a characteristic distribution. Tabulating the number of specimens occurring at each inch of depth in the groups at I-V on the profile (fig. 22) the following series were obtained. For comparison with these, data of Volk and Mercer from Lalor field are tabulated. (E. Volk: *Archaeology of the Delaware Valley: Papers of the Peabody Museum of Archaeology and Ethnology*, vol. 5, Cambridge, Mass., 1911, p. 85 et seq. H. C. Mercer: *A New Investigation of Man's Antiquity at Trenton: Proc. Amer. Assn. Adv. Sci.*, 1897, Salem, 1898, p. 370 et seq.) It must be noted that in both of Volk's series the frequency of positions mentioned in the text is represented, not the number of specimens.

Depth Below Plane of Contact (Inches.)	FREQUENCIES								
	I	IIa Artifacts	IIb Bone	III	IV	V	Volk 1894	Volk 1897	Mercer 1897
0	..	I	..	..	..	..	..	..	..
1	..	0	I	..	..	..	..	..	..
2	I	I	0	..	..	I	..	..	2
3	2	I	2	..	I	3	I	I	I
4	2	6	I	..	7	I	9	3	I
5	3	0	4	..	5	3	9	6	0
6	0	I	0	..	9	14	13	4	6
7	4	4	5	..	5	14	7	4	I
8	4	6	9	..	8	5	15	6	4
9	I	4	6	..	I	I	7	4	0
10	0	2	2	2	5	0	11	5	3
11	4	3	3	0	4	2	6	4	0
12	I	6	5	4	6	0	15	7	6
13	0	0	4	I	4	0	2	2	0
14	2	I	4	2	..	0	3	2	I
15	0	I	0	4	..	0	I	2	2
16	0	I	I	I	..	I	I	2	2
17	0	I	2	5	..	0	..	2	0
18	I	0	0	2	..	0	..	2	0
19	..	0	I	4	..	I	..	2	I
20	..	I	I	2	..	..	..	3	I
21	..	0	I	5	..	..	..	3	..
22	..	0	0	4	..	..	..	I	..
23	..	0	0	3	..	..	..	..	..
24	..	2	0	4	..	..	..	..	..
25	..	..	0	I	..	..	..	..	..
26	..	..	0	I	..	..	..	..	..
27	..	..	0	2	..	..	..	..	..
28	..	..	0	..	..	..	..	..	..
29	..	..	I	..	..	..	..	..	..

These series are shown in graphic form in fig. 24.

An inspection of these series shows their similarity in range and manner of dispersion. The ranges are similar, varying from 13 to 21 inches (for if a random instance be omitted from Series II*b*, its range is 21 inches rather than 29 inches). In each series the position of maximum frequency is at the middle of the range, and the distribution is symmetrical about this point with the frequency of occurrence progressively less from the center to the extremes of the range. We recognize the close resemblance, if not identity, between

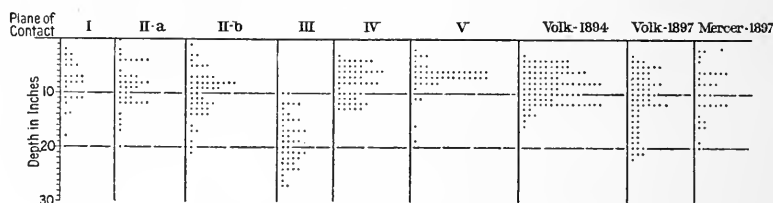


FIG. 24.—Vertical distribution of groups.

the form of distribution common to these nine series and the typical frequency curve. We are to conclude then that in these groups there is a uniform manner of vertical distribution.

In view of the fact that the data from Lalor field resemble those from Abbott farm in indicating a unimodal vertical distribution, we would be inclined to expect that the specimens occur throughout the entire district in a single plane of deposition.

Having determined the distribution of the artifacts in a definite manner, let us consider their relations to other features of the yellow loam.

Artifacts were found in, above, and below the red bands which traverse the yellow loam. The relation between the sequence of the red bands and the uniform vertical distribution of the artifacts was found to be highly variable.

Artifacts were found among the pebbles in the loam. The walls of the trenches were examined and the vertical range of distribution of the pebbles was noted. In ten of the sixteen cases where pebbles and artifacts were noted at the same points, we found that their vertical ranges were either identical, or the range of the artifacts

was included in that of the pebbles. To determine the manner of distribution of the pebbles and its relation to that of the artifacts, series were obtained at III and V on the profile (fig. 22). Tabulating the number of pebbles in each inch of depth below the plane of contact, and comparing corresponding data for the artifacts, we obtain the following series:—

Depth Below Plane of Contact (Inches)	FREQUENCY			
	III		V	
	Artifacts	Pebbles	Artifacts	Pebbles
0	..	2	..	..
1	..	4	..	4
2	..	4	1	6
3	..	4	3	3
4	..	1	1	10
5	..	2	3	16
6	..	5	14	20
7	..	5	14	20
8	..	3	5	22
9	..	5	1	18
10	2	9	0	14
11	0	5	2	10
12	4	9	0	8
13	1	8	0	10
14	2	9	0	12
15	4	17	0	2
16	1	21	1	6
17	5	32	..	4
18	2	32	..	2
19	4	32	..	0
20	2	41	..	2
21	5	30	..	2
22	4	40	..	1
23	3	33	..	0
24	4	33	..	1
25	1	24	..	0
26	1	24	..	0
27	2	23	..	1
28	..	20	..	..
29	..	31	..	..
30	..	40	..	..
31	..	34	..	..
32	..	30	..	..
33	..	21	..	..
34	..	14	..	..
35	..	13	..	..
36	..	9	..	..
37	..	7	..	..
38	..	1	..	..
39	..	1	..	..
40	..	1	..	..
41	..	1	..	..

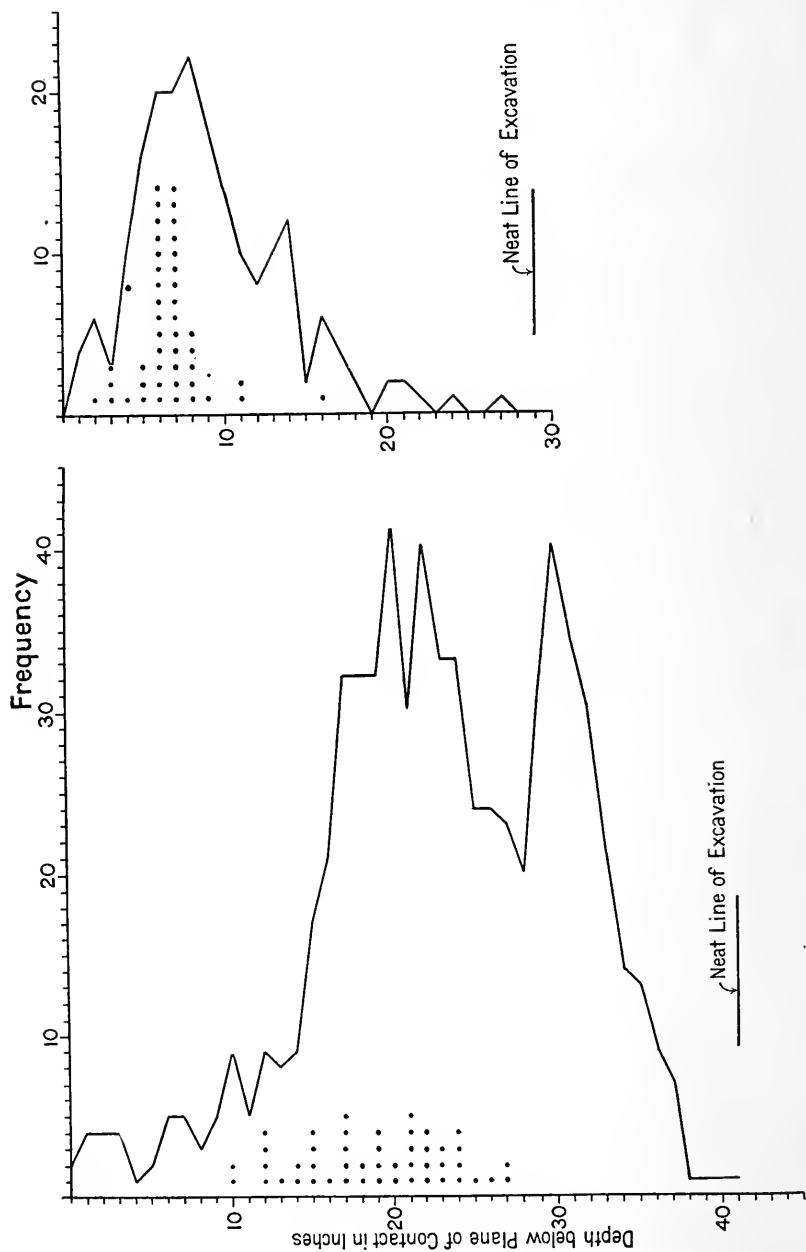


FIG. 25.—Vertical distribution of artifacts and pebbles of groups III and V. Artifacts =, Pebble, = ———.

These series are shown graphically in fig. 25. An inspection of the two pebble series shows their similarity and their close resemblance to the typical frequency curve. On comparing each with the corresponding artifact series, we note that the modal points occur at about the same depth, that the manner of distribution is identical, and that the range of dispersion of the artifact series, if not identical with that of the pebbles, falls within it. If we are to conclude that the pebble series are identical with the corresponding artifact series, it seems reasonable to regard both as components of a single series.

It seems possible to apply statistical methods for a further and detailed comparison of these data.

To summarize, these data may be interpreted as showing:

1. That the artifacts are culturally distinct from those of the Delaware.
2. That they lie throughout the site, and probably throughout the district, in groups forming a single plane in the upper part of of the yellow loam and roughly parallel to the surface.
3. That they have a characteristic vertical distribution.
4. That, while they bear no fixed relation to the red bands, their vertical distribution is probably identical with that of the pebbles.

AMERICAN MUSEUM OF NATURAL HISTORY,
NEW YORK CITY.

THE APPLICATION OF STATISTICAL METHODS TO THE DATA ON THE TRENTON ARGILLITE CULTURE¹

By CLARK WISSLER

THE writer will briefly consider the suggestion of Mr. Leslie Spier that statistical methods can be applied to the tabulated positions of artifacts and pebbles in the Trenton deposit. Perhaps more than any other phase of anthropological research, archeology is languishing for the want of improvements in method. Those who work in other sciences know that a great deal depends upon the method of handling data, but current archeology itself furnishes good examples of this as in the far reaching results of Dr. Kidder's study of pottery, Mr. Nelson's decisive chronological determinations in the Galisteo pueblo group, and lastly Professor Kroeber's suggestive chronological classification of sites near Zuñi. In each case it was a matter of method. Mr. Spier has also made an important contribution in pointing the way to the use of much more precise methods of handling stratigraphic observations.

Mr. Spier's specific point is that the tabulation of his finds according to successive depths in inches gives a typical frequency curve. Following up this suggestion we may apply certain well-known criteria to the data.

I. First we may ask, if the series of artifacts from the different trenches are homogeneous, or are true samples of the same general distribution. Inspection indicates that the several distributions tend to the same form. Calculating the averages (A) and variabilities (σ) in the usual way we get the following for Spier's frequency tables:—

	n	A	σ
I.....	25	8.1	± 3.80
IIa.....	42	9.9	± 4.35
IIb.....	53	10.2	± 4.67
III.....	47	18.8	± 4.84
IV.....	55	8.0	± 3.21
V.....	46	7.0	± 2.52

¹ Read by title before the American Anthropological Association at Washington, D. C.

It will be noted that the values of A are similar except for III. In this case there are no artifacts in the first 9 inches of deposit, so that if we deduct this we have $A = 9.8$. The maximum difference in A would then be 2.9 and the certainty of this would be expressed by ± 0.82 . This cannot be considered as indicating a certain difference in the true values for A . Since all measurements were taken from the line of contact with black soil, we introduce another variable into our series, which though obviously small in value still must tend to disturb our averages. Even the slightest allowance for this would leave much less reason to consider the distributions as independent.

We are also able to compare these data with those of Volk and Mercer from trenches in Lalor field.

Volk	1894	109	7.8	± 2.87
	1897	65	11.2	± 5.31
Mercer	1897	56	9.8	± 4.87

With one exception these fall within the preceding limits. Mr. Volk's 1897 finds give $A = 11.2$ which gives us a maximum difference of $11.2 - 7.0$ (our lowest average) = 4.2. The certainty of this value for $A = \pm 0.77$. While this approaches a real difference even when discounted for the plane of contact variable, it is but one case out of seven. Further we must note the possible change of the plane of maximum frequency as indicated in III and that we are comparing trenches in separate sites. Further, the measurements of Mr. Volk are all taken together while each of our series represents a single section of a trench.

In conclusion it may be said that we are justified in treating all these distributions as parts of the same series, or that the same causes of deposition acted on all. There is then a plane of maximum deposition running through the entire deposit, the direction of which is indicated by the averages for our different series.

2. The next point to consider is, Are the artifact series component parts of the pebble series? This is a much simpler problem than the preceding because we can compare the data from each trench separately. First, let us take Mr. Spier's series for V. The pebble

series contains 194 cases giving an average of 9.1 ± 4.37 . As stated above, the artifact series for the same trench is 7.0 ± 2.52 . The difference between these is 2.1 ± 0.53 . While this is a variation that falls near what may be considered a real difference, it is not far enough removed to be positive.

The series of pebbles for III requires special consideration since it was made by two observers. Mr. Hoover, the chief field assistant, carried the trench to a depth of 29 inches at which point Mr. Spier took it. Mr. Spier's count was considerably higher than that of Mr. Hoover and the combined series gives a curve of composite appearance. As no sifter or gauge was used to determine the minimum size of pebbles, individual differences in the observers should be expected. The entire series was as follows:—

PEBBLE SERIES FOR III

Inches	Pebbles	Inches	Pebbles
0	2	24	33
1	4	25	24
2	4	26	24
3	4	27	23
4	1	28	20
5	2	29	31
6	5	(Change of Observers)	
7	5	30	40
8	3	31	34
9	5	32	30
10	9	33	21
11	5	34	14
12	9	35	13
13	8	36	9
14	9	37	7
15	17	38	1
16	21	39	1
17	32	40	1
18	32	41	1
19	32	<hr/>	
20	41	Total 675	
21	30	Average depth . . 23.31 +	
22	40	$\sigma = 7.55 +$	
23	33		

Comparing this with the artifact series for the same trench we get a difference of 4.5 ± 0.77 . As it stands this is a positive difference. We note, however, that the distribution is not altogether symmetrical and that the difference corresponds to the change in observers.

The best way to approach this case seems to be the following:
Let us assume that:

1. Sizes of pebbles are constant.
2. That both observers are equally accurate in count and measure.
3. That observer *y* took smaller pebbles than *x*.

Then it should follow that *y*'s curve would have the same base as *x*'s and both be typical and symmetrical. In this case *y* and not *x* completed the last quarter (approximately) of the series. Under the previous assumption *y*'s count for a given ordinate will exceed *x*'s by a constant ratio of increment. Had either alone completed the series the average would have been the same, one having a larger number of cases than the other. In this case it is clear that *x* was on the last quarter of a typical distribution curve and when *y* took up the count he started with a higher value but reached the same point on the base as would *x* had he continued. Since *y*'s other pebble curve is symmetrical and the joint obtained curve has the approximate form of the theoretical curve in our figure, we may consider assumptions 1 and 2 proven.

When we calculate the average for the *xy* curve, the value obtained will be too high because the greater count of *y* is added to one side alone. Just how much reduction should be made to reach the true average is difficult to calculate, but by inspection of the curve as plotted, it appears probable that the corrected average would fall between 19 and 20. In any event the value of the obtained average (23.3 ± 7.55) would be considerably reduced and any such reduction would tend to bring it down to the level of an accidental difference.

From Mercer's published data for his trench in Lalor field, Mr. Spier was able to check out the following:—

56 pebbles.....	11.7 \pm 5.96
31 artifacts.....	9.8 \pm 4.87
	<hr/>
	1.9 \pm 0.61

Attention should be called to the fact that a series of bone fragments was given by one trench (IIb). The average for this was 10.2 ± 4.67 which can be shown to be coincident with the artifact series for the same trench.

While all the preceding leaves little ground for differentiating between the pebble and artifact series, it may be noted that in each of the three cases the average for pebbles is actually higher than that for artifacts. Should this hold for a few future cases, it would make it quite probable that there was a slight real difference between the two series. Yet this would not materially affect the main point, that the artifacts and pebbles occur together.

3. We shall now consider the question, can the manner and agency of deposition for pebbles and artifacts be determined by a study of the distribution curves? This is a comparative problem. If we knew just how pebbles are distributed in sand of known origin, we could make a direct inference. Unfortunately, we have at hand no such data for either water or wind deposits.

In the case of artifacts we are somewhat more fortunate. Mr. N. C. Nelson's pottery tables for the refuse heap at San Cristobal Pueblo give us large segments of two typical curves (3 and 4). Here the manner of distribution is known, but we do not know the particular causes that give us this form of curve. That it represents an increase and decline of population is unlikely because another type of pottery tends to be numerically constant throughout. It seems more likely that these curves represent in the main the rise and decline of a culture trait. But these curves represent special types of pottery and not the ceramic trait as a whole. When we take the total number of pottery fragments in the section excavated we find them tending to be constant. The wide fluctuations occur approximately at the nodes of the distributions for the selected types. As the totals stand for each level in the San Cristobal refuse heap, it is difficult to see how they can be interpreted as indicating

anything but an average uniform intensity of the ceramic trait as a whole and a fairly constant population. On the other hand, we do have fluctuations appearing as due to the rise of certain popular styles and it is these styles only that give us the typical distribution curve. These assumptions are based upon the idea that the number of pottery fragments finding their way into a refuse heap at a given moment will be proportional to the number of pots in use.

TYPES AND VARIETIES OF POTSDHERDS AND THEIR NUMERICAL REPRESENTATION IN
EXCAVATED SECTION OF REFUSE HEAP AT PUEBLO SAN CRISTOBAL, NEW MEXICO

Table from N. C. Nelson.

Thick- ness of Section	Corru- gated Ware	Biscuit Ware	Type I. Two and Three Color Painted Ware.	Type II. Two Color Glazed Ware.			Type III. Three Color Glazed Ware	Totals
			Black-on- White Painted Ware	Red Ware, Black or Brown Glaze	Yellow Ware, Black or Brown Glaze	Gray Ware, Black or Brown Glaze	Gray, Yel- low, Pink Wares, Combination Glaze-and- Paint Design (7)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
1st ft.	57	10	2	24	23	34	5	155
2d "	116	17	2	64	90	76	6	369
3d "	27	2	10	68	18	48	3	173
4th "	28	4	6	52	20	21	..	131
5th "	60	15	2	128	55	85	..	345
6th "	75	21	8	192	53	52	1?	402
7th "	53	10	40	91	20	15	..	229
8th "	56	2	118	45	1	5	..	227
9th "	93	1 (?)	107	3	..	..	..	203
10th ft. = 8 in.	84 (126)	1 (?)	69 (103)	..	..	..	..	153

In many respects the chipping industry represented in our trenches is comparable to a ceramic trait elsewhere. Now the total ceramic curve at San Cristobal is not of the symmetrical form found at Trenton. It is only two curves for selected types of pottery that take this form. These are then curves of specific styles in ceramic art and not the typical distribution for the ceramic art of San Cristobal as a whole. If this is correct then we should not expect to find our artifacts at Trenton taking the distribution forms we have shown, unless they were deposited by some agency other than human. It may be objected that this chipping may be a single style

pulsation like one of Mr. Nelson's types of pottery. The difficulty in accepting this view is that we have no other associated traits. It is scarcely conceivable that such a trait should go out without parallel displacing traits. The objection does not therefore seem a valid one, and we have in these facts of distribution another reason for considering the Trenton deposit to be a geological phenomenon. It would be conceivable that the Trenton curve represents merely the rise and decline of population, if it were not for the facts of pebble distribution and the horizontal alignment of artifacts. These alone seem sufficient objection to such an interpretation.

We may also compare some shell-heap data. In the report of Loomis and Young on a shell-heap in Maine (The American Journal of Science, 1912, pp. 17-42) we have a diagram giving the precise locations for all artifacts in a given unit of space. Unfortunately, the table of measurements is not given but an approximate tabulation can be checked out that will serve our purpose. Accordingly, Mr. Spier has made the following compilation for a two inch interval.

Inches	Unworked Bones	Worked Bones	Worked Stone	Pottery	Total
3	6	I	..	..	7
5	4	I	..	I	6
7	3	..	..	..	3
9	7	2	..	..	9
11	11	5	I	2	19
13	3	..	I	..	4
15	I	2	I	I	5
17	5	I	..	..	6
19	3	I	..	..	4
21	I	..	..	..	I
23	17	2	3	2	24
25	..	..	I	..	I
27	5	..	I	..	6
29	8	2	I	..	11
31	..	2	I	..	3
33	..	I	..	..	I
35	23	7	..	..	30
37	3	..	..	..	3
39	I	..	..	..	I
41	2	I	..	I	4
43	3	..	..	..	3
45	I	..	I	..	2
47	3	..	..	..	3
49	31	I	..	..	32
51	6	..	..	..	6

It will be noted that on the average every twelfth inch marks a layer of great frequency with more or less scattered finds between. If, for example, we divide the diagram according to these points of greatest frequency, we get four zones containing 44, 44, 52 and 48 finds respectively. There is no good reason why the unworked bone in this table is not comparable to the bone fragments in our Trenton trench II*b*, but there is no similarity between their distributions.

Thus when we compare two typical examples of deposition incident to cultural activity we do not consistently find the normal type of frequency curve, whereas at Trenton all our finds, bone, pebbles, and artifacts, have this single type of distribution. Hence until some additional data are brought forward, we must consider the depositing agent at Trenton to be geological.

The tendency of geologists has been to interpret this site as a wind deposit. It is now necessary for them to show that wind will deposit pebbles of this size and in such a vertical order, because the preceding observations are far more consistent with the assumption that water was the agent of deposition.

AMERICAN MUSEUM OF NATURAL HISTORY,
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STONE IMPLEMENTS FROM TRENTON AND STATEN ISLAND: CHARACTER AND SOURCES OF MATERIALS

BY J. VOLNEY LEWIS

INTRODUCTION

THE materials used in this investigation include thirty arrow points and other implements and fragments from the Abbott farm, near Trenton, and ten specimens from village sites on Staten island. Of the total of forty, thirty-six are shown in plate VIII; the other four (three from Trenton and one from Staten island) were destroyed in the preparation of the thin sections for microscopic study.

GENERAL CHARACTER

Seventeen of the thirty specimens from Trenton and nine of the ten from Staten island are dark brown and purple to black argillite, identical in character with well-known facies of Triassic argillite, prominent outcrops of which occur along the Delaware and its tributaries from five to thirty miles distant from Trenton. Four other specimens from Trenton and the remaining one from Staten island are very similar in appearance to the argillite, but are harder and more flinty in character and are known as hornfels. These are exactly like the hard-baked varieties of Triassic shale and argillite along the contacts of the intrusive trap rock (diabase) masses of both New Jersey and Pennsylvania.

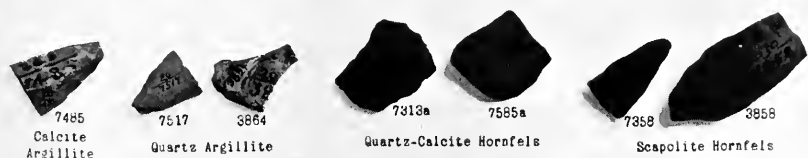
There are eight specimens of sandstone, and four of these are of the variety commonly known as "bluestone," a hard, fine-grained, bluish-gray sandstone used extensively in the form of thin slabs as flagstone. Such material occurs in great abundance in the Hamilton (Devonian) formation of southeastern New York and continues southwestward into Pennsylvania near the north-



(Trenton)

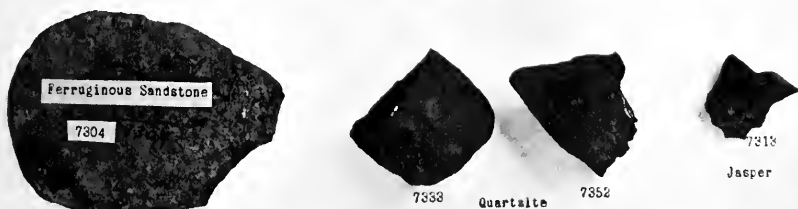
OPAL ARGILLITE

(Staten Island)



BLUESTONE

Hornfels Breccia



STONE IMPLEMENTS FROM TRENTON, N. J. AND STATEN ISLAND, N. Y.



western corner of New Jersey. The famous Hudson river bluestone, once extensively used in New York and other cities, has been quarried in many places along the middle reaches of the Hudson. Flagstone of nearly the same character also occurs a little nearer, in the same general region, in the Martinsburg (Ordovician) formation of northern New Jersey and adjacent states, where it has been quarried in a few places. Numerous outcrops of these bluestone formations occur in New York, New Jersey, and Pennsylvania, within fifty to seventy-five miles of Trenton.

Of the other four specimens in the sandstone group, one is a dark purplish-red, highly ferruginous sandstone; two are quartzite, a hard, highly silicified variety of sandstone; and one is a dense yellowish jasper. These may be correlated with well-known varieties of Hardyston (Lower Cambrian) sandstone and quartzite, which outcrop in many places in northern New Jersey and southward in Pennsylvania, within forty miles or less from Trenton.

The remaining specimen (from Trenton) is siliceous oolite, identical in character with Cambrian and Ordovician oolites of central Pennsylvania. These are particularly abundant about State College and Bellefonte, in Center county, about 175 miles from Trenton; but similar rocks in smaller amounts are also known in the eastern parts of the State and in northern New Jersey, in oolitic beds of the same ages, providing a possible source within forty miles of Trenton.

References are made above to the probable original sources of the materials, although the fragments used by the Indians may have been brought in part at least by the streams, since similar fragments are found among the constituents of the terraces which are prominent in many places along both the Delaware and the Hudson.

RELATIVE ABUNDANCE

Confidence in the above correlations with the probable sources of the materials is strengthened by consideration of the relative abundance of the various types. Thus at Trenton seventeen out of a total of thirty specimens are argillite, quite certainly derived from the Triassic formation, which is near at hand and which also

affords numerous accessible outcrops of sound rock. The Triassic hornfels is also near, but only four specimens of this rock were found. The outcrops of hornfels, however, are much more restricted than those of argillite, and fresh specimens are by no means so readily obtained. An equal number of bluestone implements and fragments were also found, in spite of the distance of the available

TABLE
CLASSIFICATION OF MATERIALS
The materials referred to may be more fully classified and tabulated

Rock	Probable Age and Source	No. of Specimens		Distance from Trenton
		Trenton	Staten I.	
ARGILLITE				
Opal argillite	} Triassic of N. J. and Pa.	14	8	5 to 30 miles
Calcite argillite		2	..	
Quartz argillite		1	1	
		17	9	
HORNFELS				
Scapolite hornfels	} Triassic of N. J. and Pa.	1	1	8 to 20 miles
Quartz-calcite hornfels		2	..	
Hornfels breccia		1	..	
		4	1	
SANDSTONE				
"Bluestone"	{ Devonian of N. Y. or Pa.; or Ordovician of N. Y., N. J., or Pa. }	4	..	70 to 125 miles
Ferruginous sandstone	} Cambrian of N. J. or Pa.	1	..	40 to 50 miles
Quartzite		2	..	
Jasper		1	..	
		4		
SILICEOUS OOLITE	{ Cambrian or Ordovician of Pa. (or possibly N. J.) }	1	..	40 to 175 miles
	Totals ..	30	10	

sources; but these rocks occur over wide areas and hard, fresh material in abundance is found in the natural outcrops. The other four specimens of the sandstone group represent nearer sources, but again this Cambrian rock is found only along narrow belts, and firm outcrops occur at comparatively few places. The single bit of siliceous oolite probably represents the more remote

and more abundant sources in central Pennsylvania, although it may have come from one of the smaller inconspicuous outcrops of similar rock near the Delaware.

The total number of specimens is not large enough to give any particular quantitative significance to the exact proportions of the different kinds; but the great preponderance of materials from nearby sources and the influence of relative abundance and scarcity are clearly seen. As already intimated, the materials from Trenton may have been obtained by the Indians either directly from the natural outcrops or from river pebbles along the Delaware or from pebbles and fragments in the stratified drift of the Cape May formation, near the surface of which they were found. In any case, however, the approximate ultimate sources and distances for most of them may be conjectured with considerable confidence, and the relative abundance of the different materials is about what would be expected, whether they were brought by the aborigines or the river or both. Similar sources of supply may be predicated for Staten island and other localities along the Hudson.

It is curious to note that no specimens of Triassic trap rocks are found among these Indian remains, although these rocks are abundant in the vicinity of Trenton and also on Staten island. The basalt flows of the Watchung mountains and the denser contact facies of the diabase intrusives of the Palisades, Sourland mountain, and numerous other masses, would seem to meet all the requirements of hardness, toughness, and density of texture. These rocks are harder and heavier, however, and much tougher and hence much more difficult to work into shape by chipping, than argillite, hornfels, bluestone, and quartzite.¹

AGE OF THE ARTIFACTS

From the petrographic examination of the materials alone no very definite conclusions can be drawn as to their age, but some of them are manifestly very old. Several of the blackish argillites are so bleached and altered that they are now a pale yellowish gray,

¹ A fuller discussion and more detailed description of these materials will be found in Bulletin 18, Geological Series, Department of Conservation and Development of the State of New Jersey.

and the bleaching has penetrated so far that only the central portion, or even a small central spot, retains the original color. These conditions are notably shown in Nos. 7303, 7448, 7476, 7485, and 7517, from Trenton, and in No. 4227 from Staten Island. One specimen from Trenton (No. 7485), undoubtedly a bleached argillite, is pale grayish in color throughout. Also the reddish quartzite from Trenton (No. 7333), originally a dark grayish rock, now has only a small central spot of this color.

The great age of these specimens is beyond question. They have been bleached by long exposure to the weather and the shallow ground waters since they were worked into their present shape. This process, especially in the dense argillites, is a very slow one, as may be seen in the natural outcrops of these rocks, which are decolorized to only a shallow depth as a rule.

On the other hand, some of the specimens are in a comparatively fresh condition, even on the surface. Apparently these are either less ancient or they have been imbedded in soil of a denser texture and hence have not been so fully exposed to the weather and the percolating ground waters.

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SKELETAL MEASUREMENTS AND OBSERVATIONS OF THE POINT BARROW ESKIMO WITH COMPARI- SONS WITH OTHER ESKIMO GROUPS

BY ERNEST WILLIAM HAWKES

PREFACE

FOR the past six years the author has made an intensive study of that very interesting people, the Eskimo. Between three and four years of this time have been spent in work among them, in Bering strait and on the Yukon river in Alaska, and in Labrador and Hudson bay in the east. Although the author has been principally interested in the ingenious culture of these masters of environment, the opportunity for physical observation has not been neglected. Consequently, when an opportunity offered for filling in a gap in the physical anthropology of the Eskimo, through the presence of a very complete and fair-sized skeletal collection, from Point Barrow, Alaska, in the Wistar Institute of Anatomy in Philadelphia, which had been left untouched since its collection in 1898, the author was very glad to supplement his information on this subject.

A year was spent on the material with the following results. The collection was measured and its general characteristics outlined and comparisons instituted with other Eskimo tribes. Later, the comparison may be extended to include the Indians bordering on the Eskimo.

The author wishes to thank the University of Pennsylvania for its cordial support in this work, and the Director of the Wistar Institute of Anatomy for generous accommodations during the pursuit of the same. He also wishes to acknowledge his indebtedness to Mr. Ralph Linton for the measurements of the long bones, and much helpful assistance in the completion of the work.

INTRODUCTION

The Eskimo present the unique spectacle of a people extending for five thousand miles across the entire northern border of a continent, living under the same climatic environment, and practically homogeneous throughout in customs and speech. Consequently, they offer a problem which is not only sectional but general, and any light which may be thrown upon their development, particularly the physical side, is of interest in connection with the general problem of the relation of man to his environment. Although the present investigation has been limited to local and racial comparisons, the peculiar situation of the Eskimo may make the results suggestive of the larger problem.

In the following pages we have concerned ourselves chiefly with the description of skeletal material from a hitherto little-studied branch of this people, the Alaskan Eskimo. The collection includes twenty-eight crania, male, female, adolescent, and infantile, and three skeletons, brought down from Point Barrow, at the extreme northern point of Alaska, in 1898 by E. A. McIlhenny. The Point Barrow Eskimo, as will be remembered from Murdoch's¹ report, possess the simple Arctic culture characteristic of the more isolated tribes of the central and eastern Eskimo, and are as yet uninfluenced by an intermixture of Indian customs and mythology, as is the case with the more southerly Alaskan Eskimo tribes. Their isolation has also preserved the purity of their physical type. The only possibilities of intermixture are with the Athapascan tribes of the interior, who are very rarely met with on spring hunting trips into the interior, and from whom they are separated by inland Eskimo tribes, and with the white whalers, whose influence, as Stefánsson has shown, has been of such short duration that it has not affected the native type. Furthermore, they are separated from the Mackenzie river Eskimo, the next division to the east, by some two hundred miles of uninhabited coast line, and only come in contact with them at infrequent intervals for trade at Barter island, or on whaling trips.

¹ John Murdoch, "Ethnological Results of the Point Barrow Expedition" (*Ninth Annual Report Bureau of Ethnology*, pp. 1-441. Washington, 1892).

Thus, the Point Barrow Eskimo have not been subject to Athapascan influence, like the interior Alaskan tribes, nor to the mixture of Northwest Coast and Russian customs present on the Yukon, nor directly to the strong Siberian influence in Bering strait. Consequently, they offer distinct advantages as a pure Alaskan group.

For purposes of comparison the Southampton island Eskimo have been accepted as typical of the central group. Their situation precludes any possibility of Indian contact and they very rarely met even other Eskimo tribes. Furthermore, we have an excellent intensive physical study of these people by Dr. Hrdlička,¹ which is a great aid in comparison. In our comparative tables we have followed the accepted routes of Eskimo migration, which appear to reveal certain well-defined tendencies in physical type as well as culture.

The Eskimo are particularly valuable as offering a fairly constant racial type for comparison with widely different Indian tribes throughout their extent. Their physical influence on two Indian stocks as different as the Athapascan and Algonkian is fully as significant as their cultural influences. Dr. Boas has suggested the strength of this influence in the east.²

On the other hand, it would appear from our investigation that the influence of the Indian on the Eskimo type in Alaska, at least in the northern section, has been overestimated. In the crania available we find that the majority of Alaskan Eskimo approximate the central type, and in individuals the racial characteristics, as the broad face, narrow nose, etc., are as strongly developed as in that area. Possibly the superior stature of the western group may be as much due to better food, clothing, and housing conditions as to an intermixture with Indian tribes, an assumption which has not yet been proven.

Particular attention has been given in this investigation to sexual differences which were found to be considerable. We find

¹ "Contribution to the Anthropology of the Central and Smith Sound Eskimo" (*Anthropological Papers of the American Museum of Natural History*, Vol. V., part 1).

² Franz Boas, "Physical Types of the Indians of Canada." (*Annual Archaeological Report*, p. 88. Ontario, 1905.)

that the exaggerated features, such as breadth of face as compared with breadth of head, on which particular stress has been laid, are not expressed in the female, but are a characteristic of the male, not only in the Alaskan but in the other Eskimo groups. The general tendency is for the male to reproduce the racial type in an exaggerated form. Consequently, owing to the scarcity of female measurements, or the ignoring of sexual differences, as in Bessels' work,¹ a set characteristic has been accepted as a racial trait.

In dealing with the mandible we have followed the illuminating suggestions of Thompson and worked out the indices which indicate the leverage of the jaw. The theory of the comparative shallowness of the glenoid fossa in the Eskimo being the result of the rotary motion of the mandible and the food used by them, as embodied in the recent study by Knowles,² has also been considered for this group. It was generally found to hold good and is being worked out in detail for later publication.

The crania offered examples of infantile, adolescent, and adult forms of dentition, for which both dental and cusp formulæ have been worked out. It was found that certain primitive characteristics, such as the additional cusp of the third molar, and the meeting of the incisors edge to edge, were present in this group.

The skeletal proportions are somewhat larger than those given by Hrdlička for the Smith sound Eskimo, but the form is as typical. Certain very primitive characteristics, such as the perforation of the olecranon fossa and the extreme forward curve of the femur, were noted in the female skeleton.

INCREASE IN STATURE AMONG THE WESTERN ESKIMO

The Alaskan Eskimo are a taller and more symmetrical people than their brethren of the central and eastern districts. They lack that appearance of stoutness and squatness inherent in the eastern stock, and for proportion and development of the various parts of the body they do not compare unfavorably with Indians

¹ Bessels, Emil. "Einige Worte über die Inuit (Eskimo) des Smith Sundes, nebst Bemerkungen über Inuit Schädel" (*Archiv f. Anthropologie*, VIII., 1875).

² Knowles, F. H. S. "The Glenoid Fossa in the Skull of the Eskimo." (*Canadian Geological Survey, Museum Bulletin*, No. 9.)

and whites. It is not unusual to find in an Alaskan Eskimo village several men who are six feet tall, with magnificent shoulders and arms and bodily strength in proportion. The usual height however is about 168 centimeters for men, which is some 10 cm. above the height of the eastern Eskimo. The Central Eskimo (Southampton islanders), according to Hrdlička, average about 162 cm. in height. The average for women among the western Eskimo is 158 cm., which approximates the height of the men in the Hudson bay region (158 cm., Boas). The female type in Alaska is taller and slimmer than in the east, and the width of the face is considerably less. Eskimo women of large stature are often seen in the northern section of Alaska. The individual variation here is more conspicuous than in Labrador or Hudson bay.

Whether these changes in physical type in the west are due to changed conditions or to intermixture with Indian or Asiatic tribes is an open question. The conditions of life of the Eskimo in the west are appreciably different. They occupy permanent villages of comfortable stone and wood iglus, as opposed to the shifting winter snowhouse and summer tent of the eastern group. For hunting game on the water, the Western Eskimo has for the most part abandoned the kayak for the larger and roomier umiak while most of the hunting on the sea ice and land is done on foot instead of with the dog sledge. Long distance foot races form one of their winter sports, and the boast of the old hunters is that they were able in their prime to run down a reindeer after an all day chase through deep snow. Consequently, we find the lower limbs much better developed here than we do further east. This may account in part for the increase in stature in the west.

The rest of the body, as well as the long limbs, has developed into larger proportions in the west. Better food and clothing, as well as better housing, may have assisted here. To one who has seen both regions, as the author has been privileged to do, there can be no question as to the superior environment of the Western Eskimo. One coming from Alaska to Labrador and Hudson bay is struck with the poverty of life in the eastern district, the hazardous food supply, and the scantiness of the material culture.

The walrus, still abundant in Alaskan waters, have largely forsaken the eastern coast. Whales are more frequent in Arctic Alaska, although rapidly growing less, than in Hudson bay as the number of whaling ships might testify. There is no such tremendous competition by white sealers and fishers in the west as obtains on the Labrador coast. Although the eastern region has the advantage in wild reindeer, the Alaskan Eskimo has drawn on the tame herds of his cousin, the Chukchi, since early times, for warm clothing, and now, thanks to the American government, has herds of his own. The general outlook of the Eskimo in the west appears more favorable, and his condition an improvement over the old home region of Hudson bay. Consequently, we might expect increased stature without taking into account a possible intermixture with the Indians of the west, which is difficult of proof.

The author does not see why the possibilities of intermixture with Indian tribes are any greater in the west than the east. So far as we know, the Eskimo have been in contact with the Indians in the east as long as in the west. In both regions there has been constant warfare and a deep-seated and ancient racial antipathy. No cases of intermixture have been recorded, although there is a bare possibility of an intermixture previous to historical times. It is true that the Alaskan Eskimo, from the Yukon south, have borrowed much of Indian customs and mythology, but even here the racial type is well preserved and the boundary sharply marked. The northern Alaskan Eskimo have more intercourse with Siberia through the Diomed islands than with the interior Athapascan. A very ancient trade has been followed by a considerable intermixture of blood in the Bering strait region. The inhabitants of the Diomedes take their descent in about equal proportions from the American and Asiatic sides of the strait. Those Eskimo who have penetrated to the Asiatic side (the Asiatic Eskimo) are now bi-lingual and have adopted the dress and habitations of the Chukchi. The amalgamation of these peoples is now nearly complete, the Eskimo only occupying a few remaining villages on the Siberian shore. Long before the advent of the white man in these parts, they made visits in company to the American side, first hostile, and

later in the way of trade. Kotzebue sound was the ancient trading place, where the tribes gathered in summer in large numbers from both sides of the strait. It is in this section that we find the increase in stature most pronounced, rather than on the Yukon or in the extreme south. Consequently, we must take into account the possibility of intermixture from Siberia as well as from the interior of Alaska, in considering the changes in physical type of the Eskimo in the west. However, it must be remembered that these changes have not been sufficient as yet to overcome the main features of the original type.

THE ACTION OF THE TEMPORAL MUSCLES ON THE SHAPE OF THE SKULL

In the adult male crania of this series the temporal crest is well marked and very high (see pl. IX). It does not appear so prominently in the female skulls and hardly at all in the infantile and adolescent series. The extensive plane covered by the temporal muscle on the adult skull would indicate a very strong development of the same.

Arthur Thompson, in his paper on *Man's Cranial Form*, has worked out the possible effects of the lateral pressure exerted by the temporal muscles on the skull. This was done by exerting pressure by means of fibers of silk on the temporal plane of an artificial skull inflated with air, which resulted in a compensatory increase in the height and length of the skull. The experiment suggested that the action of the temporal muscles on the Eskimo skull was similar.

Hrdlička later showed that the effect of the temporal muscles on the infantile skull was slight, and, as the articulations became more firm, the increased resistance would offset the pressure of the muscles. He suggested that the temporal muscles act as confining pads, and that the growing skull, conforming to the line of least resistance, enlarges in the other two main directions, namely, height and length.

The pressure of the temporal muscles is proportional to the amount of their use. Consequently, we should expect to find the female skull much more scaphoid than the male, as the Eskimo

women are almost constantly engaged in chewing boot soles and skins outside of the regular exercise the muscles would get in eating. But the contrary is true. The female skull is broader and less scaphoid than the male, and the temporal surfaces less marked. The cephalic index of the female skulls is 76.06 in our series, as contrasted with the purely dolichocephalic skulls of the males, which average 72.65. The adolescent and infantile crania also tend toward mesocephaly, with average cephalic indices of 75.26 and 77.68 respectively. The term mesaticephalic, then, fits the appearance of the female and young skulls more accurately. The dolichocephalic character of the head would appear to be attained in growth. In the more scaphoid type of the male skull perhaps we have another evidence of the adult male producing the racial characteristics in an exaggerated form.

SEX DIFFERENCES

The importance of the sex variation in the Eskimo is considerable, and appears to have been overlooked by most investigators. Duckworth and Pain, in their valuable correlation of Eskimo head and skull measurements, were careful to make this distinction. The main variation in the Point Barrow skulls, outside of the more scaphoid appearance of the male skull already mentioned, is in the relation of the breadth of face to the width of the head. In nearly every case it is under 100 in the females and over 100 in the males, the breadth of face being excessive in the males but less than the width of head usually in the females. Both the facial and frontal width approximate the maximum breadth of the skull more closely in the female than in the male. The cephalic and altitudinal indices are higher in the female, although the capacity is considerably less. The facial and nasal indices agree fairly well in both sexes. The palatal (external) index of the female is higher than that of the male, and the palate broader, due to the extensive use mentioned above. The alveolar prognathism of the two sexes is practically the same (97.53 being the alveolar index for males, and 97.198 for females). The adult condition does not seem to differ greatly from that of the adolescent (alveolar index 97.706). (See Table A.)

The mandible of the male is heavier and larger absolutely, but not proportionally. The general development and lines in both sexes is similar. The coronoid index, which indicates the leverage of the jaw (as formulated by Thompson), is remarkably uniform in

TABLE A

ESKIMO CRANIA FROM POINT BARROW, ALASKA

Measurements as to Form; Prognathism

Cat. No.	Sex	Bas. Pro.	Bas. Nas.	Alv. Index
5400	male	104	104	100.00
5401	"	111	106	95.50
5403	"	97	101	96.04
5406	"	105	108	97.22
5408	"	105	108	97.22
5409	"	96	102	94.12
5410	"	98	106	92.45
5411	"	107	108	99.07
5414	"	113	116	97.41
5415	"	105	105	100.00
5418	"	109	107	101.87
5423	"	107	107	100.00
5425	"	104	102	101.96
5426	"	100	108	92.59
Averages	....	104.3	106.2	97.53
5402	fem.	99	102	97.06
5405	"	97	98	98.98
5416	"	95	101	94.06
5420	"	97	98	98.98
5428	"	94	97	96.91
Averages	....	96.4	99.2	97.198
5404	adol.	94	96	97.92
5407	"	89	93	95.70
5413	"	86	90	95.56
5417	"	99	102	97.06
5421	"	92	92	100.00
5424	"	96	96	100.00
Averages	....	92.6	98.1	97.706
5412	inf.	78	85	91.76
5422	"	80	83	96.39
Averages	....	79	84	94.075

male and female (39.75 for males and 39.19 for females). The mandibular index is greater in the male (100.15 for males and 90.478 for females). This is due to the female mandible being rela-

tively shorter and broader than the male, probably due to the more extensive rotary use of the same. The male mandible is approximately as long (condylosymphisial length) as it is wide (bi-condylar width.) The gripping and grinding powers of the jaws in both sexes is tremendous. The Eskimo workman uniformly uses his teeth to reinforce his hands in tightening lashings or undoing knots of frozen sealskin. The constant chewing by the women soon wears their teeth to a common level. The inclination of wear is slightly oblique, and pronouncedly so in the men, the outer edge of the teeth being worn on the lower jaw and conversely above (see pl. XIV). In both sexes there is a strengthening of the alveolar process at the molars to withstand the heavy strain put upon them. The molars themselves often show an extra cusp, and sometimes an accessory one, while the third molar in many cases has a foliated appearance, giving additional small cusps.

The bones of the incomplete female skeleton were found to be much more primitive than those of the two male skeletons. The olecranon fossa were perforated, and there was an excessive forward curve of the femur which was absent in both male skeletons. The exostoses for the attachment of muscles were also more pronounced in the female skeleton. Generally speaking, the female skeleton strikes one as more primitive and less differentiated, and the male as more specialized toward a racial type.

THE FORM OF THE PELVIS

The female pelvis in the Eskimo is chiefly remarkable for its large dimensions. A specimen from Davis strait measured by Turner gave the following results:—

	Conjugate	Transverse	Oblique
Brim.....	4 5/8 in.	6 in.	5 6/8 in.
Cavity.....	5 5/8 "	5 2/8 "	5 4/8 "
Outlet.....	5 2/8 "	5 1/8 "	5 4/8 "
Circumference of Brim.....			16 1/2 in.
Depth of Pelvis.....			4 "
Index of Brim.....			76 "

The female pelvis in the present series was incomplete, only one innominate bone remaining. The dimensions of the same were,—

height 205 mm., breadth 150 mm., index 73.13. The measurements of the male pelvis were as follows,—max. breadth (external) 299 mm., general pelvic index 78.92, ant. post. diameter 106 mm., lateral diameter (internal) 132 mm., pelvic index at superior strait 80.30.

It will be seen from the above dimensions that in the Eskimo as in other races, the male pelvis is larger in the brim but smaller in the outlet than the female pelvis. The dimensions of the outlet appear to be unusually large in the female pelvis, which accounts for the swift and easy parturition of the Eskimo women reported. There is a general custom among the Alaskan Eskimo of expelling the infant by pressing on the abdomen. This operation is performed by certain old women, who act as midwives for the village. A stout sealskin thong is drawn tightly around the waist of the patient, the position of the child located, and pressure exerted downward by the operator, who stands behind the patient with hands locked over the abdomen. The patient kneels on the floor, in which position she is delivered in a short time. The operation is not usually commenced until labor is well under way.

OCURRENCE OF AN EXTRA VERTEBRA IN THE ESKIMO

In the complete male skeleton (5864) thirteen dorsal vertebræ were found instead of the normal twelve. The eleventh, twelfth and thirteenth vertebræ closely approximated in form the normal tenth, eleventh, and twelfth. The thirteenth vertebra was of normal size and thickness, with well-developed lateral facets for the attachment of ribs. The thirteenth rib was present on both sides, being rather smaller than the normal twelfth rib, but still well developed. The twelfth rib, on the other hand, was much longer than in normal individuals, and showed signs of cartilaginous attachment at the tips.

The incomplete skeleton (5429) also gave evidence from the articulation of the presence of an additional vertebra between the twelfth dorsal and first lumbar vertebra. Turner in the *Challenger Reports* also mentions the occurrence of a supernumerary vertebra in this position in the case of two Australians and an Eskimo female skeleton examined by him. More recently Charles Dawson has

drawn attention to the frequency of extra vertebræ in the Eskimo. He treats it as a racial characteristic acquired through the continual balancing necessary in handling a kayak.

The wonderfully light construction of this little craft, made of driftwood and skins, without keel or ballast, requires continual tension to keep it from capsizing. Under these circumstances, it is an advantage to have a flexible back and long waist, and the individual possessing these characteristics has a better chance of survival. When the kayak is overturned, he is able to right himself by a powerful twist of the body and stroke of the paddle. This trait, transmitted and become general through the survival of the fittest, would in time become a racial characteristic. Another factor making for a flexible waist is the backward bend of the hunter in poising the harpoon when in the kayak, and the continual twist of the body in using the double-bladed paddle on either side alternately.¹

The additional vertebra is a simian characteristic and occurs in very primitive races. It is another evidence of the primitive structure of the Eskimo skeleton, in keeping with other anomalies discovered in this series as the perforation of the olecranon fossa, the extreme forward curve of the femur, etc.

The lumbar curve in the Eskimo is, however, not in keeping with the primitive traits above mentioned, the index (after Cunningham) being intermediate between that of the European and those of the primitive peoples. The index for the Eskimo is 99.7, as opposed to 95.8 for the European and 107.8 for Australians, 106.6 for Bushmen, and 105.4 for negroes. The lumbovertebral index of 5864, in which the thirteenth dorsal vertebra was present, is 99.6, thus differing by only .1 from that given by Cunningham as the Eskimo normal. This apparently inconsistent characteristic of a supernumerary vertebra, in conjunction with a well-developed curve, may be accounted for by the exercise of the waist mentioned above, which demands a high degree of suppleness and elasticity conducive to

¹ The author does not wish to insist upon this possible explanation. In a large series of Eskimo skeletons from St. Lawrence island examined by a friend since this article was written, an extra vertebra was found in only two. So that it would appear to be a not uncommon anomaly among the Eskimo, rather than a racial trait.

the formation of compensatory vertebral curves. It is noteworthy that the Alaskan Eskimo, who do not use the kayak with the same expertness as the Greenlanders, from whom Dawson drew his material, nevertheless retain this racial characteristic of a well-marked curve.¹

OCCURRENCE OF OTHER ANOMALIES

Although the Eskimo skull is scaphoid in shape, the sagittal suture remains open to an advanced age, in contradiction to the early closure of crania of this shape in other races, due to lateral pressure. In only three of the twenty-eight Point Barrow skulls is there a complete fusion of the parietals. One of these is a male, and the other a female, both aged. The other case, curiously enough, is that of an adolescent skull. The sagittal suture is completely closed although the other sutures are well marked and dentition is incomplete. The shape of the adolescent skull is rounded rather than scaphoid. The female skulls are less scaphocephalic than the male.

In several of the skulls of both sexes the metopic suture is not yet closed in the region of the glabella. The infra-orbital suture persists in a majority of cases. There are ten cases of the appearance of Wormian bones in the occipital region, and one skull (5428) shows the rare Epiteric bone. A search for evidence of grooves formed by the supra-orbital nerves in the frontal region and blood vessels in the occipital,² which are said to be rare in the Eskimo, failed to reveal anything in this series.

The incisors, in the young as well as in the adults, meet edge to edge, instead of overlapping as in most races. The canines also meet instead of falling one behind the other and are worn down to a level with the incisors. They are much thickened and approach the pre-molar in shape. The position and wear of the front teeth sug-

¹ Cunningham, Lumbar Curve in Man and the Apes. *Cunningham Memoirs, Royal Irish Academy*, 1886.

² "On Certain Markings, Due to Nerves and Blood Vessels, Upon the Cranial Vault; Their Significance and the Relative Frequency of their Occurrence in the Different Races of Mankind," A. Francis Dixon, *Journal of Anatomy and Physiology*, Vol. 38, 1904.

gests a side-to-side grinding movement of the jaw in the Eskimo as in Mousterian man, as opposed to the direct bite of civilized man. The extremely broad palate of the Eskimo is further evidence of this movement. Consequently, the teeth are worn off obliquely the inclination being inward on the upper jaw and outward on the lower.

In one aged male skull (5403) the atlas is fused with the base of the skull, resulting in an obscuring of the outlines of the foramen magnum, which appears distorted. In another male skull (5404) the foramen magnum is decidedly asymmetrical. In 5408, owing to a diseased condition of the bone (plate XIV), the entire base of the skull is twisted out of shape. The pyriform shape of the foramen magnum was not noted in any of the crania.

INFANTILE AND ADULT CHARACTERISTICS

Duckworth and Pain, in "A Contribution to Eskimo Craniology," have outlined those characteristics of Eskimo crania which they attribute to growth, and those which they believe are retentions of infantile traits. The present series has been carefully gone over with this in mind. Of the infantile characteristics retained in the adult the following held good: the megasemic orbital aperture, the flattened nasal skeleton, the small mastoid processes, and the persistence of the infra-orbital suture. For the rest, the pyriform contour of the foramen magnum was not present in either the young or adults, the prominence of the chin was more apparent than real, and the most important infantile trait suggested, the dolichocephalic character of the skull, was not borne out by our results at all. Both the infantile skulls in our series are mesocephalic (indices 78.85 and 75.5), as are the three "young" skulls from Southampton island described by Hrdlička, with cephalic indices of 78.1, 77, and 76.1 respectively. We would therefore be inclined to place the dolichocephalic character of the adult Eskimo head under those characteristics acquired by growth. To this we would add the other traits suggested by Duckworth and Pain under this head; the low nasal index, depending on the extreme narrowness of the nasal aperture (which Hrdlička suggests may be an adaption

to extreme cold); the greater prominence of the malar bones, and the scaphocephalic cranium without sagittal synostosis. Of these the difference in nasal width is not great proportionally between young and adult skulls, and the scaphocephalic cranium is much more frequent in the males.

INDIVIDUAL VARIATION

The accompanying table of the variation of the indices of individuals within the three great Eskimo branches (see Table B), eastern, central, and western, was suggested by a table of the individual variation in the indices of a set of Labrador and Greenland skulls examined by Duckworth and Pain. It appeared feasible to extend this treatment to other Eskimo groups and denote the individual variation within each group and as compared with each other. The number of crania in the different groups is not exactly the same, but sufficiently close for general conclusions. For the central group the adult skulls of Hrdlička's Southampton islanders have been taken, and for the western, the adult crania in the present series. Hence, we have small but representative groups for comparison.

In those indices which determine the racial affinity of Eskimo tribes, the cephalic, vertical, nasal, and orbital, the average indices of all three groups are very close. Consequently, when we find the traits which the indices reveal, a dolichocephalic head, megasemic orbits, and leptorhinian nasal structure persisting throughout these groups, we may safely conclude that the racial relation is strong, and that the variations of tribe and tribe are less than the individual ones. We might further expect that the individual variation would be greatest in that branch which has been subjected to the additional stimulation afforded by an improved environment and contact with races of a superior type and culture. Consequently, we find the individual variation more noticeable in the west, and the western type with lengthened face, shortened bi-zygomatic breadth, and increased stature somewhat different. But the change is a very gradual one from group to group, and the physical type, like the culture and language, dominated by the same essential traits throughout.

Judging from the indices, the relation of the Western Eskimo is closer to the Central than the Eastern Eskimo.

TABLE B

COMPARATIVE TABLE OF VARIATION OF INDICES OF EASTERN (LABRADOR AND GREENLAND), CENTRAL (SOUTHAMPTON ISLAND), AND WESTERN (ALASKAN) ESKIMO

Index	No. Skulls	Locality	Average	Divergence		Variation
				Above	Below	
Cephalic	20	Eastern	71.5	75.4	65.8	9.6
"	14	Central	74.55	78.2	68.6	9.6
"	21	Western	74.748	79.66	70.35	9.3
Vertical	9	Eastern	73.5	79.2	69.3	9.9
"	14	Central	74.3	79.2	66.2	13
"	21	Western	73.673	76.76	68.84	7.92
Orbital	8	Eastern	88.65	94.7	78.6	16.1
"	13	Central	90.87	105.4(?)	82.4	23
"	21	Western	89.98	99.50	83.95	15.55
Nasal	7	Eastern	45.55	50	40.3	9.7
"	13	Central	43.05	48.4	38.7	9.7
"	21	Western	41.072	48	33.93	15.07
Facial	6	Eastern	54.36	62.3	49.3	13
"	13	Central	52.65	54.9	46.1	8.8
"	21	Western	53.09	59.29	44.05	15.24
Gonio-zygomatic ..	7	Eastern	80.9	91.5	74.6	16.9
" ..	...	Central	...	...	...	...
" ..	21	Western	75.92	89.20	71.74	15.46
Palato maxillary...	7	Eastern	112.1	120	105.3	14.7
"	13	Central	119.4	127.3	106.7	20.6
"	18	Western	120.545	129.79	106.78	23.01
Horizontal circum. .	10	(Eastern)	513.5	550	476	74
" ..	14	Central	517	532	491	41
" ..	21	Western	507.8	540	487	53

Note.—The Central and Western measurements for horizontal circumference do not include the glabella. The palato-maxillary measurements are also external for both. Duckworth and Pain do not describe the Eastern measurement whether external or internal, for the palato-maxillary, or including glabella in the horizontal circumference. Measurements are all of adult crania. The Central measurements are taken from Hrdlička's Southampton island tables, and the Western from our Point Barrow series.

MEASUREMENTS IN DETAIL

Form of the Skull.—The detailed measurements of the crania of the Point Barrow Eskimo illustrate the general tendency of the

breadth of the head to keep constant in spite of a wide variation in length. The breadth averages of 137.3 for the males and 135.8 for the females may be compared with the corresponding length aver-

TABLE I.
ESKIMO CRANIA FROM POINT BARROW, ALASKA
Measurements as to Form: Head Measurements

Cat. No.	Sex	Length	Breadth	Bas. Height	Ceph. I.	Alt. I.	Ht. and Br. I.
5400	male	185	139	142	75.14	76.76	102.16
5401	"	196	140	143	71.43	72.96	102.14
5403	"	186	137	134	73.66	72.04	97.81
5406	"	189	137	134	72.49	70.90	97.81
5408	"	190	134	137	70.53	72.11	102.24
5409	"	181	131	131	72.92	72.92	100.00
5410	"	188	137	137	72.87	72.87	100.00
5411	"	185	135	137	72.97	74.05	101.48
5414	"	199	141	149	70.85	74.87	105.67
5415	"	191	137	141	71.73	73.82	102.92
5418	"	199	140	137	70.35	68.84	97.86
5423	"	187	137	141	73.20	75.40	102.92
5425	"	182	137	134	75.27	73.63	97.81
5426	"	190	141	144	73.68	74.21	102.13
Averages	....	189.1	137.3	138.6	72.65	73.24	100.68
5402	fem.	180	132	136	73.33	75.56	103.03
5405	"	181	136	130	75.14	71.82	95.59
5416	"	173	133	132	76.88	76.30	99.25
5420	"	182	137	136	75.27	74.57	99.27
5428	"	177	141	131	79.66	74.01	92.91
Averages	....	178.6	135.8	133	76.06	74.45	98.01
5404	adol.	173	131	133	75.72	76.88	101.53
5407	"	178	134	130	75.28	73.03	97.01
5413	"	175	132	127	75.43	72.57	96.21
5417	"	179	128	133	71.51	74.30	103.91
5421	"	176	130	126	73.86	71.59	97.67
5424	"	173	138	129	79.77	74.57	93.48
Averages	....	175.6	132.1	129.6	75.26	73.82	98.30
5412	inf.	166	127	122	76.51	73.49	96.06
5422	"	160	126	117	78.85	73.13	92.86
Averages	....	163	126.5	119.5	77.68	73.31	94.46

Note.—All measurements, unless otherwise indicated, are in millimeters. Length and breadth are maximum measurements. The height is the Basion-Bregma height.

ages of 189.1 and 178.2 respectively (see Table I.) The increase from the adolescent breadth average of 132.1 is slight relative to the

increase from the adolescent length average of 175.6. It will be noted here, as elsewhere, that the female approximates the adolescent type.

The well-known extreme length of head of the Eskimo is fully realized in this western group in the male series which attains an average of 189.1, which is as high as that of the purest central type (Southampton island, 189). There is considerable individual variation in the Point Barrow group, 182/196, which, however, is less than that of the central group, 179/204 for a smaller number. This phase has been dealt with by itself. It is not significant here, except to illustrate the fact, that with the supposedly purest groups of a racial type there is a large individual variation.

The average length of the female skulls in our series is much less, 178.6, and the range of individual variation smaller, 173/182; which, taken in conjunction with the above-mentioned tendency to constancy of breadth of head, places them well within the limits of mesocephalic skulls. It should be borne in mind, however, that this is a result of the lessening of the extreme length of head in the female sex and not a consequent broadening. As will be shown in later tables, the females have not acquired in proportion to the breadth of head, the extreme breadth of face characteristic of the males, while they have preserved other prominent traits, as the narrow nasal aperture, the broad palate, and deep set orbits.

The narrow-headedness of the Eskimo is well represented in the Point Barrow skulls. The average width, 137.3 for males and 136.8 for females, is less than that of the Southampton island Eskimo, 140 in males and 137 in females, but close to that of the Mackenzie Eskimo, 137 (Russell). There appears to be a tendency for the width of the head to decrease toward the west from the central region, which probably goes with a decrease of the width of face, until the broad-headed Aleutians are met with. Nevertheless, the racial tendency of the Eskimo toward a long, narrow head is as evident among the males in the west, as among the Eskimo generally in the east.

As might be expected from the extreme length, the cephalic index of the males, (72.65) shows a well-marked tendency toward

dolichocephaly. Only two skulls in the series give averages above 75. The female skulls are more inclined to be mesocephalic, the average being 76.06. If we compare this figure with the adolescent average (75.26) we are again struck by the similarity of the female to the adolescent type. The infantile skulls give the high average of 77.68, owing to their lesser length. The breadth (126.5) remains remarkably close to the adult skulls.

In Table 2 a comparison has been made of the cranial indices of the various branches of Eskimo. It will be seen that the cephalic

TABLE 2.

COMPARATIVE TABLE OF CEPHALIC, ALTITUDINAL, AND HEIGHT-BREADTH INDICES OF ESKIMO GROUPS

Locality	No.	Sex	Collector	Ce- phalic	Altitud.	Height Breadth.
Eastern—						
E. Greenland.....	4	?	Pansch	72.9	74.2	101.70
W. Greenland.....	21	?	Bessels	72.6	73.7	101.05
Labrador.....	6	?	Duckworth	72.08	73.05 ¹	101.34
Central—						
Smith sound.....	99	?	Bessels	71.37 ²	76.91	107.96
Southampton island .	9	male	Hrdlička	74.2	74.1	99.8
Southampton island .	5	fem.	Hrdlička	74.9	74.5	99.4
Mackenzie—						
Herschel island.....	9	?	Russell	74.6	73.5	98.76
Alaska—						
Point Barrow.....	16	male	Hawkes	72.65	73.24	100.68
Point Barrow.....	5	fem.	Hawkes	76.06	74.45	98.01
Bering strait.....	4	?	Army Med. Mus.	75.82	76.33	100.76
Aleutian.....	15	?	Bessels	86.49	74.02	86.05

index increases from the east to the west, while the altitudinal and height-breadth indices decrease. That is, the head becomes less elongated and scaphoid, and more rounding in the west. Unfortunately, we do not possess figures for the indices of the sexes over this entire area, but in the central region the female cephalic and altitudinal index is slightly higher than that of the male and in the Point Barrow skulls notably so. Two female skulls in the Bering strait group have cephalic indices of 75.14 and 78.57 as compared to the indices of 72.68 and 78.87 in the two male skulls. The shorter

¹ Four Greenland skulls were included in this index.

² Cephalic index for 100 skulls, other indices for 99.

head of the women in the west would tend to raise the index. Within the western group itself, Table 3 shows the gradual rise of the mean of the cephalic index from the Mackenzie river to the Aleutian islands. The approach appears to be toward the broad-headed Aleutian type rather than the Athapascan of the interior.

TABLE 3.

COMPARATIVE TABLE OF CEPHALIC INDICES OF WESTERN ESKIMO

Index	Herschel Island	Pt. Barrow	Bering St.	Aleutian Is.
70	...	3	...	...
71	...	3	...	...
72	I	4	...	...
73	I	5	I	...
74	3 ¹	...	...	...
75	2	7 ¹	I	...
76	2	2	I	...
77	...	...	...	...
78	...	2	I	I
79	...	2	...	...
80	...	...	...	...
81	...	...	...	...
82	...	...	...	2
83	...	...	...	...
84	...	...	...	I
85	...	...	...	3 ¹
86	...	...	...	I
87	...	...	...	I
88	...	...	...	2
89	...	...	...	I
90	...	...	...	2
91	...	...	...	...
92	...	...	...	I
Total skulls.....	9	28	4	15
Average index.....	74.6	75.15	75.82	86.49

According to the measurements of A. J. Stone, the interior Alaskan Eskimo radically differ from the Athapascans, with whom they come in contact, in the form of the head, the length and breadth of the face, and the shape of the nose. The superior height of the Eskimo skull gives it a larger capacity than would be judged from

¹ Denotes mean measurements. Had it been possible to use the living measurements of A. J. Stone on the Nunatagmuit, an interior Eskimo tribe situated between Point Barrow and Bering strait, with an average cephalic index of 81, and a mean measurement of 82, the step between the Bering strait Eskimo and the Aleut would be nicely bridged. The difference between the cephalic index of the head and the skull, according to Boas, is 2.2 for the Eastern Eskimo.

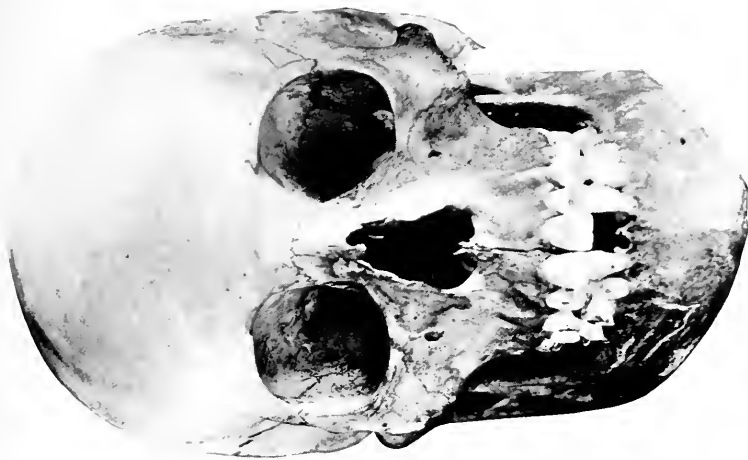




A
POINT BARROW ESKIMO SKULLS: A, ADULT FEMALE, B, MALE, SHOWING RELATIVE DEVELOPMENT



A



B

POINT BARROW ESKIMO SKULLS: A, INFANTILE, B, ADOLESCENT, SHOWING RELATIVE DEVELOPMENT. INFANTILE SKULL IS ASYMMETRICAL





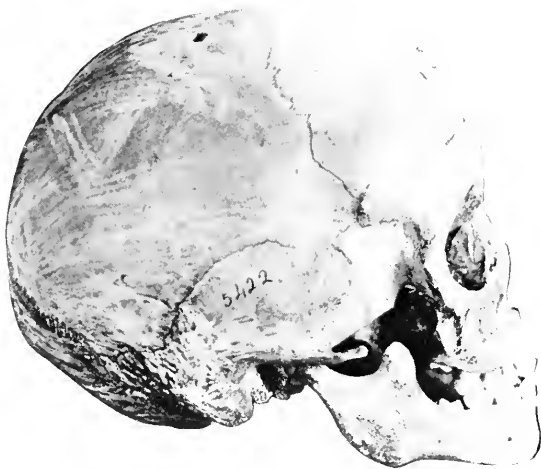


A



B

POINT BARROW ESKIMO SKULLS: A, FEMALE; B, MALE



A

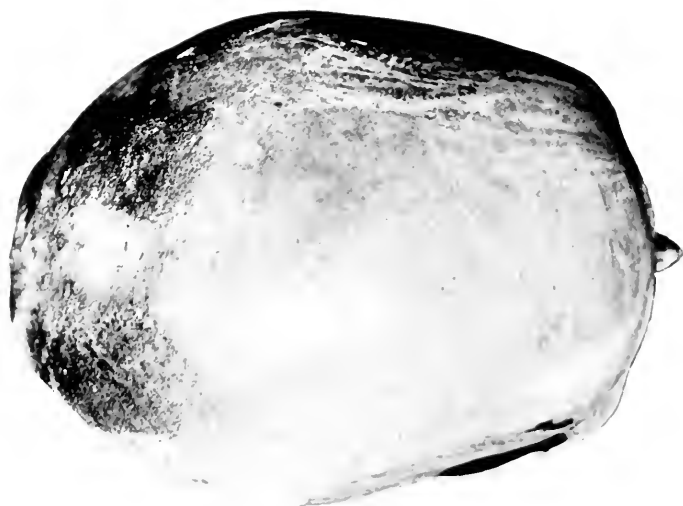


B

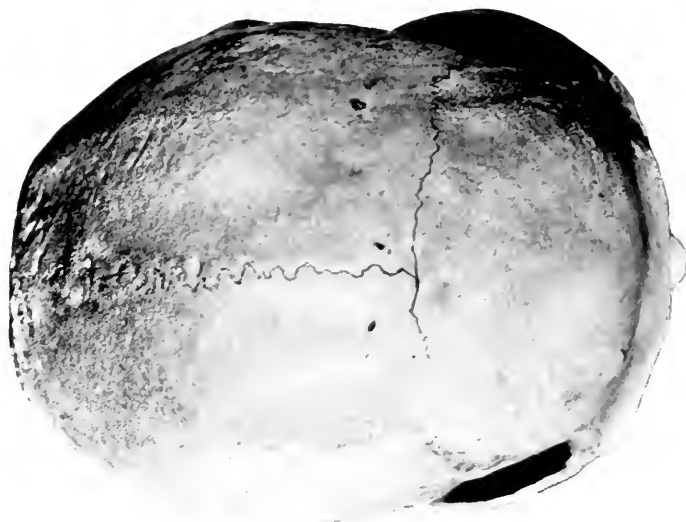
POINT BARROW ESKIMO SKULLS: A, INFANTILE; B, ADOLESCENT







A



B

POINT BARROW ESKIMO SKULLS: A, ADULT FEMALE, B, ADULT MALE, SHOWING RELATIVE DEVELOPMENT



A



B

POINT BARROW ESKIMO SKULLS: BASAL VIEW, A, ADULT FEMALE, B, ADULT MALE, SHOWING BREADTH AND DEPTH OF PALATE AND OBLIQUE WEAR OF TEETH



its small frontal width. In fact, some heads are so scaphoid as to appear pathological. In spite of the extreme height of the Eskimo head, the altitudinal index is much diminished by the extreme length of the skull. Consequently, the Eskimo have a lower height index than the Lapps, who have a notably low skull, and who attain a higher degree on account of their shortness of head. The height breadth index gives a truer picture of the proportionate shape of the head, outside of length. Topinard suggested a combination of the height and height-breadth indices, an averaging of the results obtained by each, which would accord more nearly with the appearance of the crania.

In ten cases out of fourteen in the male series of the Point Barrow skulls the height exceeds the width. Among the Eastern Eskimo the proportion is greater, the general type having a width of 144 mm. and a height of 150 mm. The average width of the Point Barrow male skulls is 137.3 and the average height 138.7. The average height of the female crania shows a considerable decrease (133 mm.), whereas the width is nearly equal to that of the males (135.8).

The difference of the sexes in relation to height and breadth of skull is well brought out in the height-breadth indices. In this series there is only one female skull which does not fall under 100 (the width exceeding the height), and only four male skulls which do not give an index above 100 (the height exceeding the width). The four male skulls in which the breadth exceeds the height possess certain peculiarities in common which leads to the suspicion that they may represent an intruding strain of blood from another Eskimo district. They all possess a very high and well-marked temporal ridge, a high keel, a narrow forehead but a wide and bulging backhead. All four show a height-breadth index of 97, and in three the measurement for height and breadth is identical, 137 mm. and 134 mm.

Capacity.—In determining the capacity of the Point Barrow skulls an attempt was made to use the general formula of Dr. Lee¹ but it was found that the results did not agree with the actual measurements. The scaphocephalic shape of the Eskimo head,

¹ *Phil. Trans.*, 196, A, 1901.

which increases the height out of all proportion, rendered the formula useless. A special formula would probably have to be devised for the Eskimo.

TABLE 4
ESKIMO CRANIA FROM POINT BARROW, ALASKA
Measurements as to Capacity

Cat. No.	Sex	Capacity	Circum.	Oph. Cir.	Nas. Opis. Arc.	Trans. Arc.
5400	male	1330 c.c.	530	510	375	315
5401	"	1610 "	545	535	383	317
5403	"	1410 "	520	510	365	305
5406	"	?	528	520	361	298
5408	"	1230 "	533	515	358	298
5409	"	?	520	495	362	302
5410	"	?	528	520	378	311
5411	"	?	520	510	352	293
5414	"	1510 "	553	540	395	325
5415	"	1480 "	533	520	380	303
5418	"	1410 "	557	540	377	310
5423	"	1480 "	535	515	370	307
5425	"	1250 "	515	505	357	303
5426	"	1550 "	530	522	372	318
Average	....	1426 "	532	517	370	307
5402	fem.	1300 "	510	500	361	303
5405	"	1200 "	507	502	360	295
5416	"	?	490	487	350	301
5420	"	1320 "	515	510	362	304
5428	"	1330 "	515	500	352	300
Average	....	1287.5 "	507.4	499.8	357	300.6
5404	adol.	1300 "	485	486	355	298
5407	"	1310 "	495	493	355	297
5413	"	1325 "	486	487	353	291
5417	"	1290 "	491	492	353	295
5421	"	1315 "	490	492	362	292
5424	"	1315 "	495	494	348	300
Average	....	1309.1 "	490.3	490.6	354.3	295.5
5412	inf.	1190 "	458	467	343	290
5422	"	1115 "	458	457	333	283
Average	....	1152.5 "	458	462	338	286.5

Note.—The figure for capacity is the average of three measurements taken on each skull, using no. 8 shot.

The circumferences are, respectively, horizontal, including and not including glabella. In the infantile and adolescent series, owing to the lack of development of the orbital ridges, the Orphryanic measurement slightly exceeds that in the inter-orbital ne. The transverse arc is measured from the upper margin of the auditory meatus.

The size of the skull was also found to be no exact criterion of the capacity, due to the large variation in the thickness of the parietal bones. One skull that appeared to be above the average in size gave a capacity of only 1230 c.c., while another skull of slightly less exterior measurement gave a capacity of 1330 c.c. The variation appears greatest in male skulls.

The capacity of the Point Barrow skulls as a whole is not as great as that of the Central and Eastern Eskimo. The average capacity of the male crania is 1426 c.c. as against 1563 c.c. for the Southampton island Eskimo (Hrdlička). The largest Point Barrow skull has a capacity of 1610 c.c., so it will be seen that the capacity is still large in the west, and that the head still maintains this distinctly Eskimo character. The female average in this group is about 1300 c.c., the general average being brought down to 1287 c.c. by one very small skull. The adolescent average of 1301.1 c.c. is instructive in showing the close correlation between the female and adolescent types, which is confirmed in other measurements.

The cause for the large capacity of the Eskimo skull still remains undiscovered. The superior inventiveness of this people is illustrated in their ingenious culture. The brain is said to show good differentiation, but no signs of extraordinary mental powers (Hrdlička). The diameter of the foramen magnum is large, indicating a stout spinal cord, which may or may not have a direct influence on the size of the brain. The large capacity of the infantile skulls, 1152.5 c.c., suggests that the large size of the brain is a racial trait, and not acquired through the educative process of their environment.

Breadth of Face in Proportion to Breadth of Head.—The Eskimo of the central region and Greenland are characterized by a very broad face in proportion to the breadth of head. The general proportion is 102, ranging as high as 105 and 107 in individuals. Eighty-five skulls from Smith sound, measured by Bessels, gave an average head width of 133 and an average facial (bi-zygomatic) width of 136, a proportion of 102. Unfortunately, in his long list of crania, Bessels made no distinctions as to sex, and this is an important difference, as may be observed in the following comparative table.

TABLE 5

COMPARATIVE TABLE OF THE PROPORTION BETWEEN BREADTH OF HEAD AND BREADTH OF FACE OF ESKIMO GROUPS

Locality	No. Skulls	Sex	Collector	Breadth Face	Breadth Head	Pro. BF/BH.
Greenland.	5	male	Davis	147	140	105
Greenland.	5	fem.	Davis	130	130	100
Smith sound.	85	?	Bessels	133	130	102
West coast Baffin bay.	5	male	Davis	137	135	102
West coast Baffin bay.	2	fem.	Davis	124	132	94
Southampton island.	9	male	Hrdlička	145	140	103.5
Southampton island.	5	fem.	Hrdlička	138	137	100.7
Herschel island.	9	?	Russell	139	137	101
Pt. Barrow.	16	male	Hawkes	141.2	137.3	102.5
Pt. Barrow.	5	fem.	Hawkes	132	136.2	96.8
Bering strait.	2	male	Army Med. Mus.	134	136.5	98.12
Bering strait.	2	fem.	Army Med. Mus.	130	131	99.24

Living Measurements

Locality	No. Heads	Sex	Collector	Breadth Face	Breadth Head	Pro. BF/BH.
Labrador.	3	male	Virchow	147	149	99
Labrador.	2	fem.	Virchow	134	137	98
Mackenzie (Kukpagmuit) .	12	male	Stone	147.8	144	102.7
Mackenzie (Kukpagmuit) .	6	fem.	Stone	139.7	141.5	99
Int. Alaska (Nunatagmuit). .	12	male	Stone	155.7	154.5	100.8
Int. Alaska (Nunatagmuit). .	5	fem.	Stone	144.6	142.6	101.6

In nearly all cases where a sex differentiation has been made, the male skulls show a proportion above 100 and the females below. In series where no such differentiation has been made, as in Bessels' Smith sound Eskimo and Russell's Mackenzie Eskimo, the general average is slightly over 100 (102 and 101), which may be considered as the average between the two sexes. But these figures are misleading, in that they fail to bring out the pronounced facial breadth in the male, and the lack of the same characteristic in the female. Consequently, owing to the small number of female skulls measured, and to their being lost sight of in the general average, the sex differentiation has been lost, and the extreme breadth of face emphasized as a racial trait, when it holds good only for the males. It will be remembered that a similar error was made in the case of the Tasmanians.

Facial Indices.—The upper facial portion of the Point Barrow

skulls is long, giving a relatively high index in spite of the extensive breadth of the face. The upper facial index (Kollmann's) of the male skulls is 52.48 (see Table 6). That of the female skulls is

TABLE 6
ESKIMO CRANIA FROM POINT BARROW, ALASKA
Measurements as to Form: Facial Measurements

Cat. No.	Sex	Breadth Bi-zyg.	BF/BH Proportion	Height Chin. Nas.	Height Pros. Nas.	Facial Index	
						Total	Upper
5400	male	144	103.60	135	78	93.75	54.16
5401	"	144	102.86	134	72	93.06	50.00
5403	"	137	100.00	119	71	86.86	51.81
5406	"	138	100.73	?	79	?	57.29
5408	"	144	107.46	127	73	88.19	50.69
5409	"	133	100.76	?	67	?	50.76
5410	"	139	101.46	5	75	?	53.95
5411	"	139	101.46	?	73	?	52.52
5414	"	146	103.55	?	81	?	55.48
5415	"	141	102.92	?	74	?	52.46
5418	"	144	102.86	143	84	99.31	58.33
5423	"	143	104.38	131	76	91.61	52.45
5425	"	143	104.38	?	63	?	44.05
5426	"	144	100.00	?	73	?	50.69
Averages	.....	141	102.60	131.5	74.2	92.13	52.48
5402	fem.	135	102.27	?	72	?	53.33
5405	"	131	96.32	114	69	87.02	52.67
5416	"	129	96.99	?	62	?	48.06
5420	"	138	100.73	113	67	81.81	59.29
5428	"	137	97.16	123	70	89.78	56.91
Averages	.....	134	98.69	116	68	86.20	54.05
5404	adol.	115	87.79	?	62	?	53.91
5407	"	125	93.28	?	66	?	52.80
5413	"	111	84.09	105	62	94.59	53.86
5417	"	121	94.53	?	67	?	55.37
5421	"	114	87.69	111	62	97.37	54.39
5424	"	121	87.68	111	65	91.74	53.72
Averages	.....	117.8	89.17	109	64	94.56	54.01
5412	inf.	111	79.53	90	54	89.11	53.46
5422	"	102	80.95	89	50	87.25	49.02
Averages	.....	106.5	80.24	89.5	52	88.18	51.21

higher, 54.05, owing to the low bi-zygomatic width. The adolescent index is about the same as the female (54.01). Here again we find

the male producing a specialized form, while the female remains little differentiated from the adolescent.

The height of the lower jaw, except in one or two cases, is not as great as one would expect from the height of the upper part of the face. Consequently, the total facial index is rather low (92.12 for males and 86.20 for females), although higher than in other Eskimo groups. In skull 5418 the symphyseal height of the mandible is 42 mm., the upper face is also much elongated, so that the total facial length nearly equals the bi-zygomatic breadth. This head is a good example of the extreme individual variations we occasionally find in the Western Eskimo, although the majority keep reasonably close to the racial type. The adolescent total facial index (94.56) is higher than that of the adults.

The upper facial index of the Point Barrow Eskimo does not differ much from that of the Southampton island Eskimo, as given by Hrdlička. Taking the average of the adult crania of both sexes, twenty-one Point Barrow skulls give an average index of 53.09 and 13 Southampton island skulls give 52.65. These averages again are close to the figures given for eastern crania by Duckworth and Pain. For six Labrador and Greenland skulls the average facial index was 54.36. This leads us to conclude that the upper facial index is another constant factor in the various Eskimo branches. But in comparing the total facial (gonio-zygomatic) index we find an increase in the west, due to the increase in total facial height in that quarter. Six male Point Barrow skulls have an average height from chin to nasion of 131.5 mm. as contrasted with six male Southampton island crania, which give a total facial length of 126 mm. (The number of male crania with mandibles happens in both groups to be the same.) Since the approximation between the head and skull measurements for facial indices has been found to be close, we may compare these measurements with those of Stone on living Alaskan natives, making allowance for a small variation (2.2, Boas, for Eastern Eskimo). Kukpagnuit (Mackenzie river Eskimo), males, facial height, 131.5 mm., which is the same as the skull measurement for the Point Barrow Eskimo males; Nunatagnuit (interior Alaskan Eskimo), 126.4 mm.;

Tahltan (northwest coast Indian), 129.2 mm.; Loucheux (interior Alaskan Indian), 122.9 mm.

The female measurements are Point Barrow (skull) 116 mm.; Kukpagmuit (head), 120.8 mm.; Nunatagmuit, 119.8 mm.; Tahltan, 118.7 mm.

Nasal Index.—Broca considered the nasal index one of the best for distinguishing the various races of mankind. It is particularly

TABLE 7

ESKIMO CRANIA FROM POINT BARROW, ALASKA
Measurements as to Form: Facial Measurements (Con.)

Cat. No.	Sex	Nasal Height	Nasal Width	Nasal Index	Palatal Length	Palatal Width	Palatal Index
5400	male	57	23	40.35	56	70	125.00
5401	"	58	25	43.10	?	?	?
5403	"	56	23	41.07	50	63	118.87
5406	"	58	21	36.21	50	63	118.87
5408	"	57	25	43.86	51	62	121.57
5409	"	56	29	39.62	48	58	120.83
5410	"	56	19	33.93	51	56	109.80
5411	"	57	22	38.60	56	65	116.07
5414	"	59	26	44.07	56	70	125.00
5415	"	54	23	42.59	53	67	126.42
5418	"	62	25	40.32	59	63	106.78
5423	"	55	22	40.00	54	65	120.37
5425	"	52	25	48.08	53	59	111.32
5426	"	59	23	38.98	50	60	120.00
Averages	.....	56.6	23	40.69	53.1	62.7	118.31
5402	fem.	54	22	40.74	53	63	118.87
5405	"	55	24	43.64	50	59	118.00
5416	"	52	20	38.46	47	61	129.79
5420	"	50	24	48.00	49	60	122.45
5428	"	51	19	37.25	49	60	122.45
Averages	.....	52.4	21.8	41.62	49.6	60.6	122.78
5404	adol.	47	20	42.55	48	61	127.08
5407	"	51	20	39.22	48	60	125.00
5413	"	46	20	43.48	40	55	137.50
5417	"	53	22	41.51	49	61	124.49
5421	"	46	21	45.65	48	58	120.83
5424	"	49	21	42.86	48	62	129.17
Averages	.....	48.6	20.6	42.545	46.8	59.5	127.345
5412	inf.	40	17	42.50	37	50	135.13
5422	"	42	17	40.48	37	51	137.87
Averages	.....	41	17	41.49	37	50.5	136.50

valuable in the case of the Eskimo, in that it distinguishes them from the Mongolian type, whom they resemble in many other respects. The Eskimo are the most leptorrhine of known races, with a nasal index of 42.33 (Broca). The Point Barrow tribe have not lost this distinctly Eskimo trait. In fact, their nasal index is slightly lower than that of the Southampton island Eskimo. The Point Barrow male crania in our series have a nasal index of 40.69 and the female of 41.62 (see Table 7); the Southampton island skulls have a nasal index of 42.3 for males and 45.8 for females. The Labrador and Greenland skulls measured by Duckworth and Pain gave an average nasal index of 45.55. There is a larger individual variation in the western group than in the others (see Table of Variations¹). One Point Barrow skull gives an index as low as 33.93. This does not mean necessarily that the Western Eskimo is a less pure type. The same causes which led to an increase of stature, a more certain and abundant food supply during the period of growth and improved conditions, may have also increased the variation in other characteristic racial traits. It will be noted that in the nasal index the females again are nearer the adolescent type. (Males 40.69; females 41.62; adolescents 42.54.)

Orbital Index.—The high value of the orbital index is another racial characteristic of the Eskimo, which it shares with the Indians of North America and the yellow race of Asia, in contradistinction to the low nasal index, which differentiates them from both. At the same time the Eskimo eye differs in appearance from the Mongolian.

The megasemic character of the Eskimo orbits in the adult is regarded by Duckworth and Pain as the retention of an infantile trait. This conclusion appears to be well borne out in the male skulls in the present series and in Hrdlička's measurements of the Southampton islanders. The index of the female skulls in the Point Barrow group falls slightly under megaseme (88.938) for the right and 88.156 for the left orbital index (see Table 8). The sexual variation of the orbital index is considerable, due largely to the greater development of the supra-orbital ridges in the male,

¹ Duckworth and Pain. *Contribution to Eskimo Craniology*, p. 129.

TABLE 8
 ESKIMO CRANIA FROM POINT BARROW, ALASKA
Measurements as to Form: Facial Measurements (Con.)

Cat. No.	Sex	Orbital Height		Orbital Width		Orbital Index	
		Right	Left	Right	Left	Right	Left
5400	male	37	38	43.5	43.5	85.06	87.36
5401	"	37	39	40.5	40.5	91.36	96.30
5403	"	37	37	41	41	90.24	90.24
5406	"	36	38	38	38.5	94.74	98.70
5408	"	38	38.5	41.2	44	92.23	87.50
5409	"	39	38	41	41	95.12	92.68
5410	"	38	37.5	40	40	95.00	93.75
5411	"	35.2	35.5	39.5	40	89.01	88.75
5414	"	36.5	37.5	43	41.5	84.88	90.30
5415	"	39	38	39.2	40	99.50	95.00
5418	"	37	37	40.2	43	92.03	86.05
5423	"	38.2	38.2	41.2	41.2	92.68	92.68
5425	"	37.5	37.5	41.5	44	90.36	85.23
5426	"	39.5	39.5	43	42.5	91.86	92.94
5864	"	37	38	42	42	88.10	90.48
Averages	.....	37.46	37.74	40.98	41.58	91.47	91.20
5402	fem.	39	37	41.5	41.5	93.98	89.16
5405	"	37	37	40	40	92.50	92.50
5416	"	34	34	40.5	40.5	83.95	83.95
5420	"	35	34.5	41	41	85.37	84.15
5428	"	36	35.5	40.5	39	88.89	91.02
Averages	.....	36.2	35.6	40.7	40.4	88.938	88.156
5404	adol.	34	34	39	39	87.18	87.18
5407	"	37	37	38	39.5	97.37	93.68
5413	"	37.5	36	36	35.8	104.17	100.55
5417	"	35.8	35.8	37	37	96.60	96.60
5421	"	35	35	36	36	97.22	97.22
5424	"	36.5	36.5	36.5	39	100.00	93.59
Averages	.....	35.96	35.71	37.08	37.71	97.09	94.80
5412	inf.	34	35	33	33	103.03	106.06
5422	"	33.5	34.5	35	33.5	96.72	103.03
Averages	.....	33.75	34.75	34	33.25	99.875	104.545

and the greater width of the male orbits. The orbits in the female skulls are rounder and less irregular than those in the male skulls. The proportion of height and breadth of the orbits is nearly equal in the adolescent crania, and the height exceeds the width in the infantile skulls. The depth of the orbits is remarkable in all the crania. The variation of the right and left orbits in individual skulls is noticeable, the difference being mainly in width.

Palatal Index.—The palate of the Point Barrow Eskimo is characterized by extreme breadth. In this racial feature they slightly exceed the Central Eskimo. The present series gives a palatal (external) index of 118.31 for males and 122.7 for females, and the Southampton island Eskimo 118.8 for males and 120 for females (Hrdlička). Within the Point Barrow series there is an occasional skull in which the palate is longer and narrower than the average. (Two male skulls give a palatal index of 106.78 and 109.80.) But the general tendency is to a very broad palate. The palate of the adolescent and infantile crania is relatively shorter than that of the adults, but partakes of the characteristic horseshoe shape.

The Mandible.—The mandible of the Eskimo is characterized by extreme bi-condylar width as is brought out in the mandibular

TABLE 9
ESKIMO CRANIA FROM POINT BARROW, ALASKA
Measurements of Mandible

Cat. No.	Sex	Condylor Symphysial Length (A)	Bi-Condylar Width (B)	Mandibular Index (A/B)	Condylor Coronoid Width (C)	Coronoid Index (C/A)
5400	male	119	122	97.54	48	40.34
5401	"	125	123	101.63	50	40.65
5403	"	106	108	98.15	40	37.04
5408	"	130	122	106.56	50	38.46
5418	"	129	123	104.88	48	37.21
5423	"	121	126	96.03	48	39.66
5864 ¹	"	122	127	96.06	41	33.88
Averages	...	121.71	121.57	100.15	46.4	39.75
5405	fem.	102	114	89.47	40	39.22
5420	"	102	120	85.00	42	41.18
5428	"	113	118	95.76	42	37.17
Averages	...	105.6	117.3	90.476	41.3	39.19
5413	adol.	93	103	90.29	36	38.71
5421	"	102	98	104.08	38	40.86
5424	"	93	104	89.42	39	38.24
Averages	...	96	101.6	94.596	37.6	39.27
5412	inf.	79	90	87.78	30	37.97
5422	"	87	88	98.86	33	37.93
Averages	...	83	89	93.27	31.5	37.95

¹ Skull 5864 belongs to complete skeleton (see measurements of long bones).



A



B



C



D



E



F

POINT BARROW ESKIMO MANDIBLES: A, ADULT FEMALE, B, ADULT MALE, SHOWING EXTENSIVE EXOSTOSES FOR MUSCULAR ATTACHMENT AND STRENGTHENING OF THE ALVEOLAR PROCESS; C, INFANTILE; D, ADOLESCENT; E, ADULT FEMALE; F, ADULT MALE

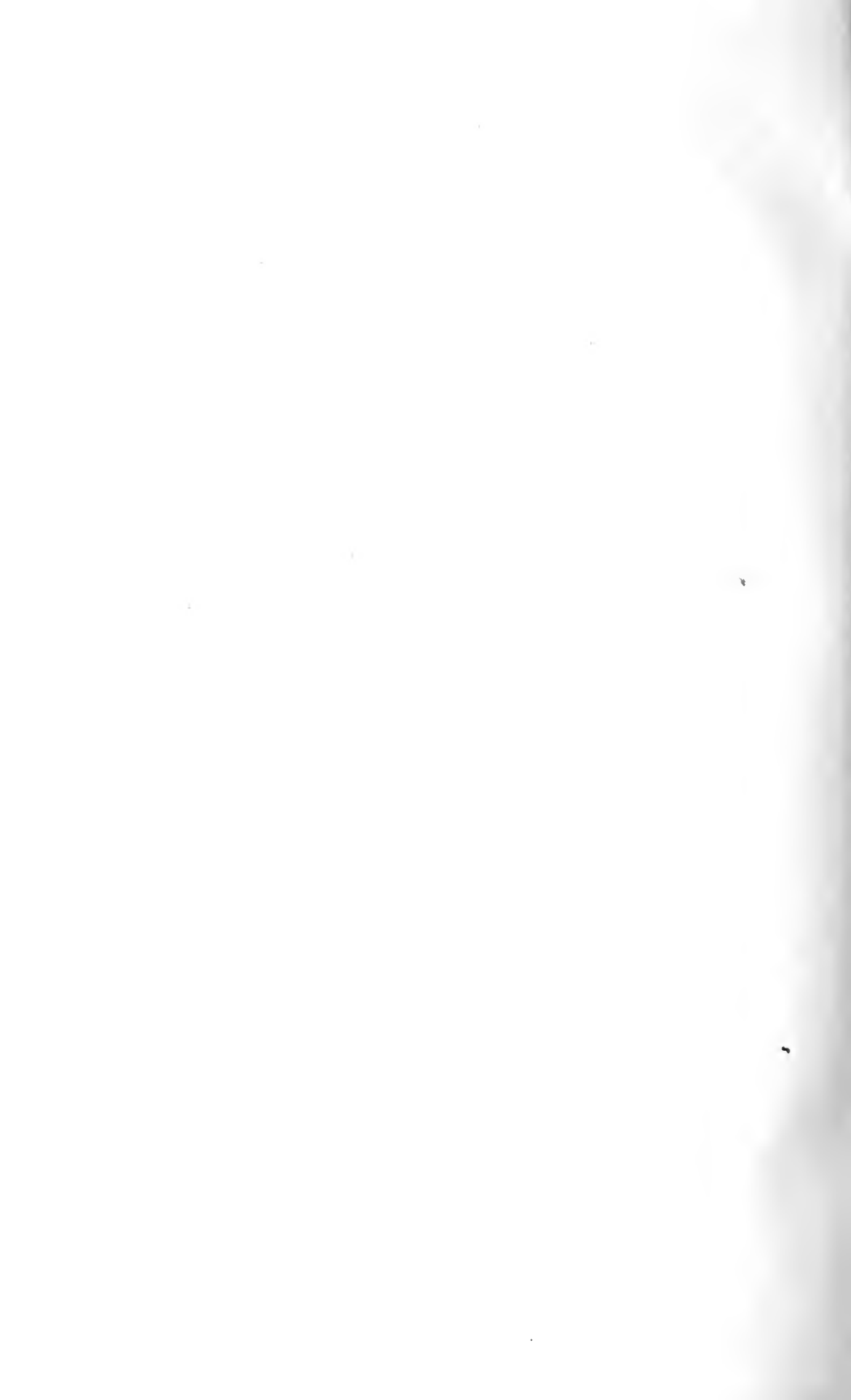


TABLE 10
 ESKIMO CRANIA FROM POINT BARROW, ALASKA
Additional Measurements of Mandible

Cat. No.	Sex	Bigon. Width (D)	Prop. (B/D)	Condylor Symphysial Height	Symphysial Height	Minimum Breadth Ascending Ramus	
						Right	Left
5400	male	116	95.08	63	36	44	45
5401	"	115	93.50	60	?	34	36
5403	"	98	90.74	49	27	39	38
5408	"	106	86.89	66	39	37	?
5418	"	112	91.06	63	42	42	40
5423	"	108	85.71	65	34	40	40
5864	"	113	88.98	65	34	38	37
Averages	.....	109.7	90.28	61.5	35.3	39.1	39.3
5404	fem.	97	85.09	58	30	37	38
5420	"	109	90.83	58	25(?)	34	33
5428	"	97	82.20	59	35	36	36
Averages	.....	101	86.04	58.3	30	35.6	35.6
5413	adol.	84	81.55	49	25	33	33
5421	"	89	90.82	47	30	32.5	31
5424	"	101	97.12	52	29	33	32
Averages	.....	91.3	89.83	49.3	28	32.8	32
5412	inf.	78	86.67	41	23	25	26
5422	"	75	85.23	41	21	28	29
Averages	.....	76.5	85.95	41	22	26.5	27.5

index (see Tables 9 and 10). The ascending rami are broad and heavy and the coronoid processes low and stout. The extent of the condylo-coronoid width gives additional leverage to the temporal muscle. The surface roughenings for muscular attachment are very prominent (pl. xv), the area for the insertion of the masseter and pterygoid muscles being very extensive.

The extraordinary pressure to which the jaw is subjected has led to an accessory thickening in the alveolar process at the second molar. This occurs in the adolescent and infantile jaws as well as the adult, so it probably is an inherited trait. One of the male mandibles (fig. 26) exhibits a diseased condition, which has resulted in atrophy of the alveolar and coronoid processes and a shriveling of one side of the jaw. The skull is similarly affected at the base and

rendered asymmetrical by adjustment to the disproportionate position of the mandible.

Dentition.—Although the Eskimo mandible is exceedingly heavy and strong, the teeth are not unusually large (see dental index) (Table 11). They exhibit very primitive and at the same time cer-



FIG. 26. Side view of Point Barrow skull, showing obliquity of the angles of the mandible and slight asymmetry of the basal portion of the cranium, due to diseased condition of the bone.

tain advanced traits. The incisors meet edge to edge as in the apes, and the fifth tubercle is often present on the second lower molar; another simian characteristic. On the other hand, the true molars decrease in size from front to back, as in the higher races, and the third molar is more often suppressed or degenerate than in any other savage people (see Table 12). The canines do not overlap,

TABLE II
 ESKIMO CRANIA FROM POINT BARROW, ALASKA
Dentition

Cat. No.	Sex	Dental Length	Basinasal Length	Dental Index
5400	male	43	104	41.35
5406	"	43	101	42.57
5411	"	44	108	40.74
5414	"	38	108	35.19
5415	"	42	116	36.21
5418	"	46	105	43.81
5423	"	43	107	40.19
5425	"	36	107	34.64
5864	"	45	99	45.45
Averages	....	42.2	106.1	40.01
5402	fem.	41	102	40.20
5405	"	41	98	41.84
5416	"	39 (?)	101	38.61
5420	"	40	98	40.82
5428	"	38 (?)	97	39.18
Averages	....	39.8	99.2	40.13

as in the anthropoids and higher races of man, but meet edge to edge, and wear on a level with the incisors. The direction of the wear is oblique, being inward on the upper jaw, and outward on the lower. The inclination is due to the outer margins of the central lateral teeth of the lower jaw being brought into contact with the inner sides of the opposing teeth in the upper jaw during the grinding sideways movements of the mandible (Knowles). The extremely tough nature of the Eskimo food, much of which is eaten raw or dried, renders the rotary chewing process much more necessary than in other savage races that live almost entirely on fresh meat. The fondness of the Eskimo for chewing tough skin of the whale or mukluk (big seal), and the regular work of the women in chewing boot soles and skins, increases this tendency.

The crowns of all the teeth are heavy, even the canine approaching the premolar in shape. In the molars an additional tubercle is often present, and occasionally an accessory one. The third molar frequently takes on a foliated appearance, with additional small tubercles (see cuspid formulæ).

TABLE 12
ESKIMO CRANIA FROM POINT BARROW, ALASKA
Dentition

Cat. No.	Sex	Teeth		Cuspid Formulæ of Molars																
		Upper	Lower	Upper					Lower											
5400	male	16	16	right	4	?	3	left	4	4	3	right	4	4	4	left	4	4	4	
5403*	"	?	14*	"	?	?	?	"	?	?	?	"	4	4	*	"	4	4	*	
5406†	"	14*	..	"	4	?	*	"	4	4	*									
5411†	"	16	..	"	?	?	?	"	4	4	3									
5414†	"	16	..	"	4	4	3	"	?	?	3									
5415†	"	14*	..	"	4	4	*	"	4	3	*									
5418	"	16	16	"	4	4	?	"	4	4	3	"	?	?	?	"	4	4	3	
5423	"	15a	16	"	?	?	*	"	?	4	4	"	?	?	3	"	?	4	3	
5425†	"	16	..	molars worn level																
5426†	"	16	..	molars missing																
5864	"	16	16	"	4	3	4	left	4	3	5	"	4	4	5c	"	4	4	5b	
5402†	fem.	16	..	"	4	?	?	"	4	3	?									
5405	"	16	14*	"	4	?	5c	"	4	3	5c	"	4	5	*	"	4	5	*	
5416†	"	15a	..	"	4	?	?	"	4	4	*									
5420	"	16	?	"	?	3	5c	"	?	?	?	"	?	?	?	"	?	?	4	
5428	"	16	16	"	?	4	5	"	4	3	?	"	4	4	5	"	4	?	5	
5404†	adol.	14	..	"	4			"	4											
5407†	"	16d	..	"	4	4	5	"	4	4	?									
5413	"	14	14	"	4	4		"	4	4		"	4	5		"	4	5		
5417†	"	16d	..	"	4	3	?	"	4	3	?									
5421	"	14	14	"	4	5		"	4	5		"	5	5		"	5	5		
5424	"	14	14	"	4	3		"	4	3		"	5	5		"	5	5		
5412	inf.	12e	12e	"	4	4		"	4	4		"	5	5		"	5	5		
5424	"	12e	12e	"	5	4		"	5	4		"	5	5		"	5	5		

* Third molar missing.

† Lower jaw missing.

a Third molar missing on one side.

b Supernumary cusp on third molar.

c Crown foliated, presenting extra small cusps.

d Third molar visible, but not fully erupted.

e All teeth of first dentition, and first molars of second.

MEASUREMENTS OF OTHER SKELETAL PARTS THAN THE CRANIA
IN THREE ESKIMO SKELETONS FROM POINT BARROW.
(RALPH LINTON)

Sternum and Ribs.—The sterna in both skeletons examined are asymmetrical, the supersternal notch being to the left of the median line. The pre-mesosternal suture slopes downward from left to right, whereas the supersternal notch slopes from right to left.

The asymmetry of the manubrium is indicated in the following measurements.

INFRA MARGIN OF THE CLAVICULAR FACET TO THE MESOSTERNAL SUTURE

5864 (male)		5429 (fem.)	
Right	Left	Right	Left
37.5	40	38	41

EDGE OF MESOSTERNAL SUTURE TO MIDDLE OF INTERCLAVICULAR NOTCH

Right	Left	Right	Left
48.5	45.2	49	47.2

TRANSVERSE DIAMETER OF THE CLAVICULAR FACETS

Right	Left	Right	Left
17	16	22.1	21

It will be seen from the above that asymmetry of the manubrium is proportional in both skeletons. The depression of the right side, however, appears to be confined to it. The levels of articulation with the ribs, the costal facets, are noticeably higher on the right side than on the left, not only as regards the upper facets, as is more usual (Thompson), but in the case of the lower as well.

The same causes which led to asymmetry of the manubrium have also led to a corresponding lengthening of the right first rib and clavicle. In both skeletons the right clavicle is four mm. longer than the left, and the first rib from one to five mm. longer on the right than the left. The contraction of the left side has resulted in a thickening of the bones and an increase of their curve with a corresponding diminution of the curve in those on the right side.¹

¹ The depression of the right shoulder, and resultant changes already noted are not confined to any one race. It has been noted in the white race and is said to be caused by carrying heavy objects on the right shoulder, or more particularly in the right hand. The heavy harpoon and dog whip which the Eskimo are accustomed to carry in the right hand, as well as the more extended use of the same, may have caused an exaggeration of this tendency.

A curious anomaly is the existence of a thirteenth rib in connection with an additional thoracic vertebra in 5864. It may have been present in 5429 also, as this skeleton had the additional vertebra, but is now incomplete.

The thirteenth rib occurs on both sides, the length being 89 mm. for the right and 87.5 for the left. They are roughened for muscular attachment and the articular facets are large and well developed. In shape, and the arrangement of bony protuberances, they agree with the twelfth rib of normal individuals. In both 5864 and 5429 the twelfth rib is abnormally long (in 5864 156 mm. for the right and 152 mm. for the left) and its tip deeply pitted for the attachment of cartilage.

In 5864 ossification has not yet taken place between the first and second parts of the mesosternum, nor between it and the manubrium, but is complete between the second and third part of the mesosternum, indicating that the skeleton is that of a young adult. In 5429 ossification is complete in the mesosternum and partial between the mesosternum and manubrium, indicating an advanced age. In 5864 the xiphisternum is ossified, but is not yet attached to the body of the sternum. 5429 is much broader, heavier, and thicker than 5864, as the following measurements show.

STERNUM, NOT INCLUDING XIPHISTERNUM

<i>Total Length (Median Line)</i>			
5864		158	
5429		155	
<i>Manubrium</i>			
	Max. Length	Max. Width	Max. Thickness
5864	39.5	63.5	12
5429	43	63.5	15
<i>Mesosternum</i>			
5864	116.5	38	11
5429	112	45	13

Vertebrae.—In the case of the vertebrae there are only two spines available for study. The vertebrae of both are well developed as to strength. In 5429 there are marginal exostoses, and the laminae and spinous process of the fifth lumbar vertebra are separate, articulating with the proximal part of the arch. The same anomaly has been noted in the fourth and fifth lumbar vertebrae of a specimen from Smith sound described by Dr. Hrdlička. In addition the lateral spine on the right side of the second lumbar vertebra is separate, and there is a facet present for its articulation. The thirteenth thoracic vertebra is present in both specimens; and has been described at length elsewhere (see Occurrence of an Extra Vertebra in the Eskimo). Except for this peculiarity 5864 is normal in every way.

The indices of the five lumbar vertebrae (taken according to Cunningham) are as follows:—

Cat. No.	5429	5864
Sex	fem.(?)	male
1	118.18	120
2	106.25	107.69
3	108.70	96.43
4	91.67	91.08
5	82	85.71
Lumbo-vertebral index....	100.84	99.6

The later of these two indices differs by only .1 from that given by Cunningham as the average for the Eskimo. In respect to the lumbar curve, the Eskimo occupies a position about midway between the European and the primitive peoples, such as the Australians, Bushmen, etc. The environmental factors which might lead to this have already been dealt with (see Occurrence of an Extra Vertebra in the Eskimo).

Innominate Bone.—The innominate bones are strong and well developed, but in no way depart from normal. The measurements are as follows:—

Cat. No.	5864	5863	5429
Sex.....	male	fem.	fem.(?)
	right left	left	right
Height (max.).....	238 235	205	206
Breadth (max.).....	171 170	150	165
Index.....	71.85 72.34	73.17	77.67

Sacrum.—The anterior curve of the sacrum is slight, and begins at the body of the second segment. The wall of the spinal canal is deficient from the beginning of the fourth segment. The normal five segments are present, and there is no indication that the first sacral vertebra has become detached to form a sixth lumbar at the same time that the first coccygeal has become ossified to the sacrum, as was the case in the two spines containing an additional vertebra described by Lane.¹

Cat. No.	Sex	Height (max.)	Breadth (max)	Index
5864	male	124	120	96.77

Scapula.—The scapulæ are remarkable for their length and narrowness, corresponding closely to those from Smith sound described by Hrdlička.

¹ W. Arbuthnot Lane, "Some Variations in the Human Skeleton," *Journal of Anatomy and Physiology*, Vol. 20, Third Part, April, 1886.

The scapular and infrascapular indices corresponded fairly well with those given by Flower.¹ These indices form a marked exception to the primitive traits usually found in Eskimo skeletons, for they are at the other extreme from those of the anthropoids, while the indices of Europeans occupy a position about midway between.

The right glenoid fossa of 5864 is larger than the left, the dimensions being 42x28.2 and 42x27.1, respectively.

In all the scapulæ examined, the superior border forms a deep, almost U-shaped notch, the characteristic being most exaggerated in 5864 and least so in 5429, in which the suprascapular notch is well marked. This concavity of the superior border of the scapula appears to be a racial characteristic, being more or less common throughout all the Eskimo groups. It rarely occurs in whites or Indians. The scapulæ of a gorilla in the Wistar Institute collection shows this same concavity, the resemblance being striking. On the other hand, it did not occur in any of eight orang utan skeletons examined. The cause of this anomaly is not evident in the culture of the Eskimo, and it may well be an inherited evolutionary trait.

Clavicle.—Special mention has been made elsewhere of the lengthening and strengthening of the clavicle on the right side in connection with asymmetry of the first rib. The bones are otherwise normal, being fairly strong, with roughenings for muscular attachment well, but not excessively developed.

Cat. No.	5864 (Male)		5429 (Fem.?)	
	Right	Left	Right	Left
Length.....	168	164	144	140

Humerus.—The humeri of 5863 were both perforated in the olecranon fossa, the openings being of fair size, and the left larger than the right. This seems to be a primitive, although scarcely simian characteristic, being of more frequent occurrence in the anthropoids than in man, and in the ancient than the modern races. Even in the anthropoids it is an individual variation. Its most frequent occurrence among human beings is in prehistoric

¹ W. H. Flower and Dr. J. G. Garson, "Scapular Index as a Race Character in Man," *Journal of Anatomy and Physiology*, Vol. 14, Part 1, October, 1879.

Indian skeletons from Arizona, in one collection of which no less than 54 per cent. had one or both humeri perforated.¹ It is not common in any living race, but occurs oftener among primitive peoples than it does among Europeans.

In 5863 the exostoses for the attachment of muscles are well developed.

Cat. No.	5864 (Male)		5863 (Fem.)	
	Right	Left	Right	Left
Max. length.....			297	293
Ant. post. diam. at middle.....	27	26	19	19
Lateral diam. at middle.....	19	19	14	14
Index at middle.....		73.08	73.68	73.68
Humero femoral index.....	68.85	67.28	73.69	72.70

Radius.—The radii are strongly built, but perfectly normal. The radio-humeral index agreed fairly well with that given by Hrdlička, although the absolute measurements were somewhat greater.

RADIUS (MEASUREMENTS)				
Cat. No.	5864 (Male)		5863 (Fem.)	
	Right	Left	Right	
Max. length.....	252	247	213	
Radio-humeral index.....	75.00	75.07	71.71	

ULNA				
Cat. No.	5864 (Male)		5863 (Fem.)	
	Right	Left	Right	
Max. length.....	270	271	233	

Femur.—In 5864 the femora are powerfully built, and exceed in length the average for both whites and Indians. The longest femur among the specimens from Smith sound described by Hrdlička was 467, while the average for males was 380.9, as opposed to 489 in this specimen. 5863 also exceeds either of the adult females described by him, being 403, as opposed to 386 for the larger of his specimens, which he expressly states was fairly tall for an individual from the eastern group. This length is the more remarkable in that the femora in question (5863) have an excessive forward curve, and very heavy shaft. The entire surface of the bone is slightly roughened, and the gluteal ridge and linea aspera are excessively developed, giving the specimens a disproportionate anterior posterior diameter at the middle. The whole appearance of the bone is very primitive.

¹ Dr. D. S. Lamb, "The Olecranon Perforation," *American Anthropologist*, Vol. 111., 1890.

Cat. No.	5864 (Male)		5863 (Fem.)	
	Right	Left	Right	Left
Max. length.....	488	489	403	403
Ant. post. diam. at middle (A).....	32	32	31	30
Lat. diam. at middle (B).....	30	29	24	23
Index (B/A).....	93.75	90.63	77.42	76.67
Min. ant. post diam. at greatest expanse of upper flattening (C).....	30	29	24	23
Min. lateral diam. at upper flattening (A) .	36	35.5	29	28
Index of flattening (C/D).....	83.33	81.67	82.75	82.07

Tibia.—The tibiae in both cases are quite normal, although in 5863 the oblique line is strongly developed and the entire surface slightly roughened, as in the femora of this specimen. The length of the tibiae of 5864 is somewhat above the average for white males, although that of 5863 is slightly below the figures given for white females. In the former the right tibia is 8 mm. longer than the left. The tibio-femoral index was above 84, thus showing a greater proportional length of tibia than in the Smith sound group, or even whites. The anterior posterior diameters were also found to be somewhat greater than for whites of corresponding sexes. This shows a considerable variation from the Smith sound group, in which they were less. On the whole, it seems that the Alaskan Eskimo have much longer and stronger legs than their eastern relatives, a difference which can be easily accounted for by their habit of taking long hunting expeditions on foot, and by their use of the roomy umiak instead of the kayak, which cramps the legs. A more certain and plentiful supply of food during the period of growth may also be an important factor in insuring a good development of the long bones.

TIBIA (MEASUREMENTS)

Cat. No.	5864 (Male)		5863 (Fem.)	
	Right	Left	Right	Left
Max. length.....	415	407	341	341
Ant. post. diam. at middle (A).....	32	31	27	28
Lat. diam. at middle (B).....	24	22.5	17.5	18
Index (B/A).....	75.00	72.58	62.11	64.29
Tibio-femoral index.....	85.04	83.39	84.61	84.61
Max. ant. post. diam. at nutritive foramen (C).....	35	34	28.5	29
Max. lat. diam. at nutritive foramen (D) .	27.5	25.5	19	18
Index (D/C).....	78.57	75.00	66.66	62.07

Fibula.—The fibulæ are well developed. In both cases they are slightly longer on the left than on the right side, thus disagreeing with Hrdlička's observations, according to which the bone was longer on the right.

Cat. No.	5864 (Male)	5863 (Fem.)
Max. length.....	399 403	326 327

PATELLÆ

Cat. No.	5864 (Male)	
	Right	Left
Length.....	46	45.5
Breadth.....	49	48
Thickness.....	20	21

OS CALCIS

Cat. No.	5864 (Male)	
	Right	Left
Height at middle between elevations.....	45.5	44
Breadth at middle minimum.....	29	28
No. of facets for the astragalus....	3	3

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A FEW ZUNI DEATH BELIEFS AND PRACTICES

By ELSIE CLEWS PARSONS

AMONG the A'shiwi as among all peoples of early culture there are a large number of what we may call social causes of death, death from breaking taboo or custom, death from failing to resort to the orthodox remedy, and death from witchcraft. General discussion of death or disease from witchcraft I must reserve for the future. In the intricacies and ramifications of Zuñi black magic I am as yet too unlearned to speak. I may note, however, that the last two epidemics at Zuñi, a smallpox epidemic in 1898-9 and an epidemic of measles in 1910-11, were both ascribed to witchcraft. The two men held responsible, both youngish men at the time they were accused, are still living in Zuñi—thanks probably to outside intervention. The story goes that in the smallpox case the American school teacher got in a detachment of American soldiers to protect the "witch." He was saved,¹ but at Pescado some of the soldiers and some of their horses died of poisoned water.² The medicineman who poisoned the water is now dead. It was his disciple, consequently a legitimate medicineman³ I infer, who was accused of causing the measles epidemic. He was so pestered³ to "confess" that finally his family begged him to "say something" and he did finally say he had "done something"⁴

¹ He had actually been hung up by his thumbs, the Zuñi method of witch execution.

² Tactics practised also against the Spaniards in the seventeenth century. (Cushing, F. H. "Zuñi Creation Myths," *Ann. Rep. Bur. Amer. Ethn.*, XIII, 1891-2, p. 331. The springs were poisoned with yucca juice and cactus spines and "with the death-magic of corpse shells." The "big shell medicine" was used in the second instance, two hundred years later.

³ The priests themselves are open to charges of witchcraft. See Stevenson, M. C. "The Zuñi Indians," *Ann. Rep. Bur. Amer. Ethnol.*, XXIII, 1901-2, p. 393.

³ The accused is tortured, Dr. Hrdlička believes, until he confesses. Then he is merely exiled. Obduracy in confessing means death. (Bull. 34, p. 168. *Bur. Amer. Ethnol.*) I also heard of several Zuñi in exile charged with witchcraft.

⁴ What, I unfortunately did not learn.

to cause the bloody diarrhoeal discharge that had been characteristic of the disease.¹ Fortunately for him, after his "confession" he was smuggled out of Zuñi for a few weeks to a settlement where the same epidemic had not been so fatal—there were too many Americans living there, it was said, and witches have no influence over Americans, Americans are "raw," they are *kwa akna* (*kwa*, not, *akna* cooked), i.e., their mothers have not been confined on the heated sand bed² Zuñi women lie in on.

Zuñi women lie in a stated number of days, four, eight, ten, or twelve³ according to the custom of their family. Were a woman to fail to observe the customary term she would "dry up," grow thin and die. Failure to observe conjugal continence during the four days before plume planting and the four days afterwards would also mean death. Does not the planter of plumes promise when he or she plants his plumes⁴ to be continent, observing the decree of the Sun Father? Of his deputy, the *pekwin*, the Sun Father requires an even greater degree of continence. For one month after the harvests the *pekwin* may have intercourse with his wife, if he wants

¹ Severe abdominal massage is a favorite therapeutic measure of the Zuñi medicine-man and to it in particular the American physician in charge of the reservation ascribed the high mortality of this epidemic. There were over ninety deaths.

Abdominal massage is practised, at least when the patient is supposed to be near death, because "there is something in the stomach which keeps a person alive. Kneading keeps it from running away."

² Whether or not as part of this *cooking* is included the heated stone continually kept in position on the mother's abdomen or the hot decoctions she has to drink I do not know.

A Zuñi woman told me *she* believed these measures were to check the return of the menses and so preclude conception.

³ One of my informants, a woman, stated that at her confinement her mother-in-law who in accordance with Zuñi custom was to look after her, ascertained from her mother that twelve days was the confinement period for her family. It happened to be the same term for the family of her mother-in-law. Another informant, on the other hand, an elderly man, said he had never heard of a twelve day confinement period.

⁴ All the initiated, i. e., all men, for every boy is initiated into the *ko'tikili*, and such women who have been initiated into that body or into the fraternities, all have to plant their plume sticks once a month, some time after the new moon. In connection with ceremonials, with remarriage, with looking after a corpse, with ceremonial hunting or foot-racing, with taking a journey, in short with almost any significant undertaking prayer plumes are planted. A married couple will plant them at the same time, in fact will go together to plant them, I was told, by a somewhat Americanized woman.

The same woman told me that continence was observed only after plume planting.

it;¹ but the rest of the year he is to abstain. The position of *pekwin* is at present vacant;² four or five months ago, in April, 1915, the *pekwin* died, a victim, it is said, to broken taboo. His relations to his wife were too intimate.³

Were a person to remarry too soon, i. e., within the Zuñi year,—it is the six months reckoned from solstice to solstice,—the stomach of the remarrying or of the person he or she marries would swell up and he or she would die. The remarrying at any time must observe certain formalities. After the first sleep with the second spouse, he or she should give something of value to the remarrying, this together with some belonging of the remarrying one should be cast away in the street early in the morning. Whoever would pick up and appropriate these articles should first kick them with the left foot four times, then wave over them four times a piece of cedarbark held in the left hand. Meanwhile the remarrying and the second spouse cut and plant prayer plumes. After four days they again cut and plant plumes. During these eight days they remain continent, the first four days for the deceased, the second four days each for himself or herself.

In connection with many ceremonials the *ko'yemshi* "gods" visit from house to house to collect food. Were they refused, "something would happen," something "bad" even if you refused them merely "in your mind." A house was pointed out to me which they had on one occasion approached only to be locked out. The woman had nothing at hand, but her refusal was particularly flagrant because she was one the *ko'yemshi* had called *an tsita*, "the mother," having worked for her and her household⁴ during the year. In

¹ It was implied that at first he might want it, but that he would learn to get on without it. He and his wife continue to sleep on the same pallet, merely having separate covers. This arrangement holds too for the more restricted periods of conjugal continence prescribed for other people.

² And it will be hard to fill, I heard. I noted too that the position of *shiwano'kia* (*shiwani*, rain priest, *okia*, woman) has been vacant for several years. One of the women who has declined it said she would not be so tied down. If her husband had to leave the pueblo to work she would wish to go along with him.

On October 14, 1915 a *pekwin* was installed.

³ I have since learned that after the death of his first wife he was twice remarried, an indulgence also criticised.

⁴ It was their dedicated *sha'leko* house.

less time than the *ko'yemshi* needed to return to the pueblo,—the house in question was a little outlying,—a child in the house was burned, burned so badly that next day it died. In one of the most distinguished families in Zuñi there are two men blind of one eye. The middle-aged of the two, a *sha'leko worle* in the *ohewa kiwitsine*,¹ lost his eye as a result of smallpox; the elderly man, a medicineman in the *ne'wekwe* fraternity, lost his in an accident from a horse.² But both are supposed to have suffered for criticisms made by them against the *ko'yemshi*.

On his children's account a man should at no time kill a snake, but were he to kill one during his wife's pregnancy the child would be born spotted like a snake and would die. Curing by the principle of inoculative magic, the principle so much relied upon in other mishaps during pregnancy, this principle would not in this case apply. It does apply, however, to another snake belief in connection with infancy. If the cord of the new-born infant "runs," it is because, it is believed, some one who has been bitten by a snake has been in the room. That person must be found and must then proceed to wave some ashes four times around the heads of mother and child—otherwise the child will die.

Were a pregnant woman to look upon a corpse her child would be still-born, or, born alive, would soon pine away.³ We may note in this connection that the women who have cared for a corpse should not touch the children of their households during the four days of their "quarantine." It is said that families who buy a child or sell

¹ Each of the six *kiwitsine* or sacred club-houses supplies annually a personator for the sacred personage called the *sha'leko*. *Worle* means manager. The position is permanent.

² The *kuku* (father's sister or clanswoman) of one of last year's *kóyemshi* is poor. She lives with her elder brother and a little sister. When the brother heard that their kinsman had taken the office of *kóyemshi*, he grumbled, knowing that a *kóyemshi* has to receive presents from his *kuku*. "Why didn't he think of us?" complained the brother. Within the year the complainer was kicked in the eye by a horse so badly that the doctor had to sew him up.

Among the Navajo injury through a horse is believed to betoken persecution by some unseen power. So are snake bites and lightning strokes. *An Ethnologic Dictionary of the Navaho Language*, p. 379. (The Franciscan Fathers, St. Michaels, Arizona, 1910.)

³ Cp. *An Ethnologic Dictionary of the Navaho Language*, p. 366.

one will become extinct. My informant said she had known of three families¹ who had taken this risk and all three were now almost extinct.

Persons who have been struck or shocked by lightning² should be given the rain water of that same storm to drink (another instance of inoculative magic), plus black beetle and suet, otherwise they will surely die. About three years ago a house on the south bank of the river was struck and the three women inmates failed to observe the proper measure of safety. The following summer two of them died and the third died this year. Properly doctored survivors are qualified by their experience to become medicinemen or women.

Different ailments or diseases are treated by the medicine members of the different fraternities, they are specialists so to speak, and there exists a deep-rooted custom of "giving"³ the patient either to the fraternity⁴ or the household of his or her doctor. Without this dedication it is believed that the patient would die. Complementariwise, if a parent were to express a wish to have his or her child join a fraternity,⁵ "something would happen." A person runs the risk of death also if, having had a "bad dream," he or she fail to be whipped and to join the fraternity of the whipper.⁶

¹ Two had bought a captive Mexican girl from the Apache, the third a Hopi girl, from her starving family.

² Wood struck by lightning is used for the fetiches of the twin war gods. Did not the Sun, their father, impregnate the spring that bubbled up out of the spot that had been struck by lightning?

³ The promise is made before the cure, "when they need the help." The time for fulfilling it appears not to be set. A woman I know who had been dedicated to the Stick Swallowers fraternity at the time of the smallpox epidemic was not initiated until two or three years ago. Part of that time she had been away at school or in the employ of Americans. She was accounted the one convert of the Dutch Reformed Church Missionary at Zuñi—until she was initiated.

⁴ For example, persons suffering from gun shot wounds must be attended by medicinemen of the Cactus fraternity.

⁵ It is the rule that if a member of a fraternity is hit, however accidentally, on his penis when he is "sacred" the hitter must join his fraternity. The last man to be taken into the *ne'wekwé* fraternity was initiated about twelve years ago under such circumstances. One mother of my acquaintance is careful not to let her little boys play at such times about the persons of her fraternity visitors. The attitude in general about joining fraternities appears to me one of reluctance, but this is a matter needing study.

⁶ If there is a dance on, one of the dancers will be selected as whipper. "Of course he becomes the ceremonial father" or initiator.

By no means have I recounted all the social causes of death, even one with a much greater knowledge of the Zuñi than I have, would probably overlook many of them; but I must pass on to other death beliefs and practices, to conceptions of the life after death. These conceptions are of the usual contradictory, inconsistent character. The dead are the rain-makers for their people and yet they dwell themselves not in the heavens but in *ko'tuwala*, a region below the Sacred Lake, the lake sixty-five miles to the southwest of Zuñi. There again although their life is just about the same as at Zuñi, families and households being reunited, the representatives of the *ko'ko* or gods are supposed to live separate—in a four-storied dwelling on the side of a hill.¹

In *ko'tuwala* reunions it is the first wife or husband a man or woman lives with.² Was there any evidence, I asked, that formerly a woman would accompany her deceased husband to *ko'tuwala*? No, but there was a story of a man who went there to find his wife. He found her and she was allowed to return with him on condition that none would cry out on her return. As she stepped, however, on the last rung of the ladder coming up into the world an old woman caught sight of her and cried out. Straightway the *revenante* was changed into an owl and flew away.

There is no punishment after death, I was repeatedly told. It is the survival theory—with one exception. The violators of clan exogamy, the incestuous if there were such, but no instance of incest had ever been known, the incestuous would be burned at *ko'tuwala*. "Surely, a Mexican belief," I remarked. "No, Zuñi." Nevertheless, it is difficult not to see in this belief the hell-fires of the Spanish Catholics lighting up the most stringent part of the native code of morals,³ and that this sanction should attach to incest and to incest

¹ Is this by any chance a reminiscence of pristine cliff-dwelling, a reminiscence associated as one might expect with the most conservative part of their tradition, their ancestral cult?

² I might not be the first wife of my first husband, I once pointed out. He would have to live with his first wife, was the rejoinder, but it was made in such a way as to suggest that that conflict in theory had never been thought of before.

³ The Hopi have also a belief in post-mortem fire tests or cleansings. (Hough, W. *The Hopi Indians*, p. 129. Cedar Rapids, 1915.)

only is in itself far from an insignificant fact.¹ The punishment, I should add, would not befall one marrying into his father's clan, a marriage nevertheless disapproved of.²

While a person is dying food is cast for him on the fire and food is put into his mouth³—"because it is the last meal." The corpse is straightway placed with the head to the east, the idea being that thus the deceased faces *ko'tuwala*.

During the four days it takes the deceased to journey to *ko'tuwala* the mourners, i. e., all the household members do not buy or sell, the house door is left ajar, and the bowl used to wash the corpse and the tools used to bury it are left on the roof. This washing and burying have been done by the nearest relatives in the clan of the father of the deceased,⁴ the washing by *an wowa*, the father's mother, and *an kuku*, the father's sister, or in their default by two other clanswomen, the burying by the father's brothers (*an adachu* or *an apapa*) or by two other clansmen. Women do not go to the burial excepting the *wowa* of a deceased infant. She will carry her grandchild to the cemetery. Parents would not touch their deceased offspring. The clansmen have to dig the grave bare-foot. The flap of the blanket in which the corpse has been carried is turned back from off the face and directly on to the face the soil is thrown. In the grave too the corpse is placed with head to the

¹ I note too that the incestuous brother and sister of the Zuñi creation myths are punished, in one version, by the great flood, the flood in which so many of the children and their parents too were drowned, the brother and sister having to remain with the drowned ones. It was this pair too who were the parents of the *ko'yemshi*, idiot, immature offspring. But whether those traits were looked upon as a punishment or not I failed to make out.

The Navajo believe that incest is the cause of mental derangement. *An Ethnologic Dictionary of the Navaho Language*, p. 350.

² It would be jeered at. "You are no better than a dog or a burro," would be the taunt. The woman who told me this spoke from experience. Child of the Parrot clan, i. e., her father, a Parrot, she had married a Parrot, but the marriage did not "stick." Nor did she make any mention of it to me. The ethnographer like other social students may learn more at times from the unspoken than the spoken.

³ Cp. Stevenson, p. 314. The lips and eyelids are pressed together *after* death, I was assured, not, as Mrs. Stevenson states, before. And the kneading of the abdomen is, as already noted, to keep back the spirit, not to dispatch it. (Ib., p. 315.)

⁴ Both functions are in charge too of the father's clan. In fact many clan kinship functions at Zuñi are functions of the father's clan.

east.¹ Zuñi will not go to sleep, we may note, thus orientated. A child falling asleep careless of this rule will be asked "Why do you wish to sleep like a dead person?"

In the ancient Spanish cemetery there stands a high wooden cross. On the south side of this cross the men are buried, on the north the women. Again I asked, "Is this custom Mexican or 'Zuñi'?"² And why do you separate the sexes?" "Because it is to the men we pray for rain, not to the women."

With the human bones that lie scattered here and there in the cemetery are a few potsherds; but whatever may once have been the practice, the pottery and the other valuables of the deceased are now buried separate, at a certain spot on the bank of the river below the town.³ Some things are burned⁴—the "comforters," for example, the deceased has used. The best clothes or blankets or jewelry are buried on the corpse. The father's people (*an da'kwik-we*) are expected to contribute a burial blanket or shawl. The dying

¹ Prayer plumes are planted pointing to the east.

² In this connection the sexuality of the six directions is of interest. Among the Hopi, north, south, and zenith are male; east, west, and nadir, female. A Zuñi rain priest told me that north, east, and zenith were male; south, west, and nadir female. The differentiation might be accounted for by the fact that the Zuñi Sacred Lake is female and that it lies to the southwest. In fact the daughter of the aforesaid rain priest did thus account for south being female. I must say, however, that other and more creditable persons said that sex was never imputed to the six directions. The matter needs further study. But I mention it now having in mind that *if* south is female and north male the cemetery distribution suggests a Spanish rather than a Zuñi origin.

Mrs. Nuttall states that in Nahuatl the west is *Cihuailampa*, "the place or part of the women" and that the souls of the women who earned immortality were supposed to go there. Men's souls went to the east (*Archaeol. and Ethnol. Papers Peabody Mus.*, II (1901), 38). In the arrangement of monuments about the plaza at Quirigua the north end holds the monuments of men, the south end those of women (Hewett, E. L., in *Art and Archaeology*, II (1915), 82).

³ Was this place perhaps the pre-Spanish general burial place? Zuñi river is supposed to convoy the buried things to the Sacred Lake. I have yet to undertake an analysis of spirit concepts.

⁴ Bulky things, was the rationalistic comment. The Spaniards reported both burial and cremation customs, a co-existence Cushing accounts for on his theory of the dual origin of the A'shiwi. The northern cliff-dwelling stock buried, the intrusive western stock burned. (*Zuñi Creation Myths*, pp. 365-6.)

The Hopi, it is said, have never burned their dead. For four days they place bowls of food on the grave. (Hough, p. 130.)

may ask not to have the finest jewelry buried with him or her—an interesting modification, and one met elsewhere, in the practice of funerary destruction. The funerary disposal is being modified too in connection with American goods. In one household was pointed out to me the porcelain cup that had been used¹ in caring for a grandmother now deceased. On the wall hung the cane the grandfather, dead too, had acquired on a visit to Washington.² Just as the goods of the stranger are not allowed to be used, as we know, in conservative ceremonial, so the old practice or theory is not applied to such goods,³ a line of least resistance the innovating administrator would do well to follow.

Perhaps the most striking illustration of "new goods, new customs" that will be notable in the future at Zuñi will be in the matter of portrait photographs. The rationalizing reason given the American for the unwillingness to be photographed is that after death the photograph will be there to remind the survivors of the deceased. To one another the Zuñi are content with saying that if they are photographed they will die. The possible connection in thought here is interesting,⁴ but I am mentioning the subject for

¹ To what extent the cup is now in use I cannot say, but it stands apparently undistinguished among other well used articles on a table in the living room. The woman who showed it to me was much amused, really amused, by the idea one of my questions suggested, the idea that her pots and pans would have to be buried with her. But whether her sense of incongruity was stirred because several of the utensils were American made or because such objects were buried, when buried at all, on the river bank. I do not know.

A like feeling of amusement was stirred in an old man when I asked him on which side of the cemetery a *la'mana* or "man-woman" would be buried? "On the men's side of course," he smiled. A sense of the ridiculous incongruity is not peculiar to the "civilized."

² In every pueblo, we remember, the governor's cane of office, one of the famous Lincoln-given canes, is preserved.

³ The fact that their own ceremonial is not applied to them either, i. e., taken over with them, may have far reaching consequences. See Veblen, Thorstein. *Imperial Germany and the Industrial Revolution*, pp. 35-6. New York and London, 1915.

⁴ Is it because the prime object of a photograph seems to the Zuñi mind to recall the dead—the living having no use for it—hence to have your picture taken is to anticipate dying, just as to express a wish to join a fraternity is, as we have noted, to cause "something to happen"?

There is perhaps a simpler explanation, one suggested in a myth reported by Cush-ing. Bereaved mothers grieve for their lost children, unaware that the children are in

another reason, for its implication that after death memory of the deceased is not to be cherished. When American portrait photography really becomes established in Zuñi the attitude towards the memory of the dead will be necessarily affected. At present the disposition to disinfection and the attitude of prompt forgetfulness are marked. Not only is the property that may recall the deceased destroyed, but emetics are taken by the corpse bearers on their return from the cemetery and baths or hair washes by the other survivors.¹ If those who have handled the corpse subsequently, i. e., within a day or so feel unwell they inhale the smoke of piñon gum.² If in dying the deceased has "frightened" anyone, a lock of his hair may be cut off and burned³ for the frightened one to inhale. Again if the deceased is thought of much by a survivor or dreamed of, the smoking piñon gum is inhaled. The name of the dead is taboo. "He who was," is the reference,⁴ or "He who has gone away."⁵ "Would the name of a dead relative be thrown up against one in a quarrel?" I asked. "Never; but children might taunt one another with a death in the family. 'Your father is dead,' a child might jeer, or 'Your grandmother died the other day.'"

a place "whither they too needs must go constrained thither by the yearnings of their own hearts in the time of mourning." (*Zuñi Creation Myths*, p. 405.) Yearning for the dead would then mean following them, consequently anything prompting such feelings, a photograph of the deceased, for example, were better out of sight.

Of the orthodox primitive reason against being pictured, that it gives power over you to the possessor of your picture, I have still to hear in Zuñi.

¹ Cp. Stevenson, pp. 306, 310. The hair of all mourners is washed after four days.

² The smoking gum is put in a shovel and a blanket thrown over it and the head of the inhaler.

³ It is always cut off and burned, according to Cushing, and its ashes cast into the river together with the ashes of whatever possessions are burned. This hair incineration is a ritualistic survival, Cushing believes, of the early custom of cremation. (*Zuñi Creation Myths*, p. 336).

⁴ Or, according to Cushing, he is referred to by a kinship term—the brother of so-and-so. ("On Zuñi Baptism," *Ann. Rep. Bur. Amer. Ethn.*, XXVI., p. 187.

In the Spanish archives Cushing found two or three soubriquets given for baptismal names "undoubtedly offered reluctantly in place of the true and sacred name, because some relative who had recently borne it was dead and therefore his name could not be pronounced aloud lest his spirit and the hearts of those who mourned him be disturbed." (*Zuñi Creation Myths*, p. 334.)

Today children are given the names of deceased kindred—in course of time. One little boy I know bears the name of an uncle deceased five or six years before his birth.

⁵ The Hopi word of reference to the deceased is *shilui*, "gone." (Hough, p. 131.)

Contrasted with the ceremonial attitude of forgetfulness towards the dead individual is, as we have already noted, the attitude towards the dead at large. They are prayed to not only for rain but for other benefits. Before each meal a bit of food will be scattered for them on fire or floor, and this is the prayer or one of the prayers accompanying the offering: "Here's something. Take it and eat it. Make our little boy (or girl) grow up and give us plenty of rain."

Some time after the *ko'haito* begins, in 1915 it was on October 30,¹ the sacred counting of forty-nine days to the arrival of the *sha'leko*, a *teniente* or member of the governor's staff announces from the house top that it is time to get wood and that four days later will be the day of the dead, *a'hapa awān dewa*, "dead their day". On that day, a portion of everything that is cooked is given to the dead. The men take the offerings to the river bank, the women put them in the fire. During the *sha'leko* ceremonial itself rolls of *he'we*, wafer bread are collected from every house by the *ko'yemshi* and taken to the river bank. These offerings are called *he'kusna* (*he'we*, *kusna*, dry). It is probable that in connection with many other Zuñi ceremonials similar offerings are made to the dead.

Before foot races or before a war expedition prayer plumes are or were planted for the dead. The night before the racers or warriors would go down to the river and there in the bank plant plumes and bury *he'we* for the dead. Then they would take four steps back, sit and listen, doing this four times. Then they would go in a straight line without looking back—were they to look back they would die—to the house of the manager of the race or of a priest of the bow. After each had smoked his cane cigarette of wild tobacco in the six directions he would be asked what he had heard. If he had heard the hoof beats of the Navajo horse or the roaring of the river or the hooting of an owl or the sound of lips smacking, all good signs, he would answer, "It is well." To hear nothing is a bad sign. The night before a deer hunt the dead are also "fed."

Of fear of the dead I have found no trace—the Zuñi would seem to have concentrated his fears upon living witches—nor are there any implications of individualistic ghost-walking—unless the

¹ October 31, I recall, is All Hallowe'en; November 1, All Saints Day.

"walking" of the patron saint may be so regarded. The little Spanish image is kept enshrined in a Zuñi house. Her wardrobe is continually replenished or enlarged by the gifts of devout Mexicans.¹ Only her shoes are worn out—for, they say, "she walks at night."

¹ She holds a disproportionately large buckskin purse in her lap. Gifts are made her by the Zuñi too, I think, but I am not sure. She has her "dance." It comes off, I was told, about the tenth of September and it is very largely attended, people from the outlying districts coming in for it. The image is carried in procession about the pueblo by the girls. To some her name is unknown, others call her the "Saint of Guadalupe."

Since writing the above I learn from Cushing's *Zuñi Creation Myths* (p. 338) that the image of Our Lady of Guadalupe was carried off from her church by vandal Americans. The figure carried in procession is St. Francis. (One of my Zuñi acquaintances had remarked to me upon the masculine traits of the image without being able to account for them.) The "Saint's dance" which occurs after the harvest Cushing considers an eclectic ceremonial, being not only a Catholic saint's day but a Zuñi feast of the dead. I have as yet failed to get evidence for this interpretation.

NEW YORK CITY.

THE DISTRIBUTION OF MAN IN RELATION TO THE INVENTION OF FIRE-MAKING METHODS

By WALTER HOUGH

THE following is a discussion of a statement published in the Report of the Congrès International des Americanistes, Quebec, 1906, p. 219,¹ that with the possession of means of making fire at will man could freely leave his early circumscribed seat and successfully spread to other environments and eventually populate the earth. The reverse of this proposition that man, ignorant of the art of making fire, would have remained in a feral state, bound to a particular environment and subjected to the restrictions laid upon the range of the highest organisms, seems also true. For merely theoretical and illustrative purposes the gorilla, an animal held to a very narrow zone on either side of the equator on account of extreme intolerance to temperature changes or dependence on a certain food supply, may be taken as an example of the limitations imposed by nature on other anthropoids. Given hand-cunning, the knowledge of the value of fire, and a method of making it, the gorilla conjecturally might have found means to spread into cooler environments, and this species might have occupied the earth. Man in his original state appears to have been less protected by thickness of skin, hairiness, and other features of robustness than the gorilla; hence, with due regard to our lack of knowledge of man as an animal or a primitive being, he would seem to have been a creature of more restricted environment than the chief primates. It is, however, necessary in the state of our present information to begin with man as a sentient being, armed with a knowledge of fire as it existed in nature, to have completed the acquirement of fire for his personal uses and to have arrived at some method of making fire artificially. We only know of man at the latter stage, and deduce from survivals

¹ Hough, Walter, *The Palm and Agave as Culture Plants*, op. cit.

the existence of former stages. We know also that in these periods of synthesis man had attached to himself the one manifestation of force that was fundamental, that articulated him to physical nature and opened a field of incalculable progress. No stimulus to man's advancement ever approached that given by the acquisition of fire. Fire, however, was not an unmixed blessing, it was a willing slave, but exacting master, its care was most burdensome and of necessity forced on organization for its maintenance and protection; perhaps the most primitive office was that of fire-keeper.

It may here be advanced with some degree of plausibility that man's apparent nakedness and helplessness was largely brought about by the use of fire. Clearly no civilizing influence is greater and much of man's physical modification is doubtless due to the cultural structures growing out of the utilization of fire and the reciprocal and cumulative effect on habits of life moulded by relationship to fire. Movements of man from a primal seat, theoretically tropical, without fire appear inconceivable. Food is the dominating condition of environment, vegetal food the basis, the versatile primate easily becomes omnivorous.

It seems logical that at an early stage in man's acquaintance with fire the effect of heat on food substances would be discovered and the preference for cooked food would arise. Cooking extends the range of the food supply and promotes its preservation for future consumption. That this art increases the probability of a successful migration into unfamiliar terrains is proven in multitudinous instances in historic times.

The distribution of artificial methods of fire-making is very interesting. The Malaysian area is the focus of all methods of fire-making by wood friction. This is especially remarkable since, generally speaking in the Western Hemisphere, Africa, Australia, the black islands, High Asia, only the firedrill, "fire borer," was known. In Malaysia the fire-saw, fire-thong, firedrill, and fire-plow, in fact all the type methods are found. Even the nomalous quartz or pottery and bamboo strike-a-light and the fire piston are peculiarly of this region. In parts of the island of Borneo, as has been remarked elsewhere by the writer, four methods have been observed

and in other localities of this region more than one method is presented by the same people. This strange focusing of fire-making methods here means that Malaysia is a center of the invention of primitive fire-making methods or that it is an example of a great intermingling of migrating races, each with its peculiar fire-making devices based on a knowledge of wood friction acquired at an early stage. Acculturation, an idea usually overworked, must also be considered as an agent in disseminating these devices; but at the same time, it must be pointed out that conservation of custom and the religious aspect of customs also have an effect on the fixity of customary actions.

In the consideration of primitive migration we may remark not only on those who traveled, but those who stayed behind. If the possession of one type of fire-making invention may be taken as evidence of racial solidarity, then those who claim as their own the simple two-stick reciprocating firedrill, spread farthest over the world. To this invention have been added the improvements of the cord, the bow, the whorl, and in one instance the wheel and cog. This invention also is known to have been superseded by the flint and steel, and has survived into civilization through the conservation of religion or folk custom. Those who stayed behind had the fire-plow, the fire-saw, and the thong-saw, but less than two millenniums ago the people of the fire-plow spread over innumerable islands almost across the vast Pacific. The races who possess the fire-saw have remained confined chiefly to the Malaysian area and those who use the thong-saw are limited to a portion of the Island of Borneo. The most interesting condensation and diffusion zone in the world, the veritable swarming place of races and inventions, is Malaysia. The last great emergence from this hive appears to have been the Polynesians who, according to Churchill, spread into the Pacific some 2000 years ago.¹ These were people of the fire-plow, who had learned through the use of heat to preserve food stores adequate for long voyages and who carried their culture plants with them. They left indelible traces of words among the dark-skinned peoples

¹ Churchill, William, "The Polynesian Wanderings" (*Carnegie Institution of Washington*, 1911, p. v, preface).

who had emerged previously, the Papuans, Melanesians, Micronesians, and Negritos. Other swarms may be dimly distinguished passing by sea or land to islands, to the peninsulas, and the mainland of Asia, and one swarm may have traversed the continent and crossed to people America, and perhaps the most ancient horde passed to Africa and also left remnants, as the Negritos, scattered widely in other directions.

There may be presented here a suggestive table of migrations from some center, preferably the inner court of Malaysia.

Earliest static period: Blacks isolated and localized as animals.

Earliest migration: Blacks, to islands, Africa, Papua, Australia, and continental fringes.

Early migration: Dark brown, to Melanesia, Micronesia, and continental fringes and peninsulas.

Ancient migration: Yellow-brown, Indonesian to Asia, America, India, Indo-China, etc.

Later migration: Lighter yellow-brown, Malays to Madagascar, Japan, Indo-China, East India Islands, continental peninsulas, and mainland of America (?).

Historic-traditional migration: Brown Polynesians to Pacific Islands, Philippines, etc.

Historic migrations: Mongols, Huns, Goths, Vandals, etc., a vast number.

Individual instances of long and difficult journeys made by men deprived of fire or other aids beyond their natural abilities in woodcraft have little bearing on the collective movements of man. These feats show wonderful resource and excite admiration for qualities that have become submerged as the race advances. Such achievements are common among the uncivilized and must have been common in the early migrations. The mass, however, moves on its food supply and carries its impedimenta of children and gear. It is not to be supposed though that the earliest migrations embraced any considerable number, rather there were tentative dislocations of a few individuals, establishing at a distance a new campfire in response to crowding, which rendered the food supply unequal to the demand. These movements in time brought contacts with others from the pristine source which in turn gave rise to more

extended movements and in larger masses. Thus, it is likely that the currents of migration would sometimes return to the place of origin bringing new experience. The theoretical contacts of primitive man have been excellently presented by Prof. Lester F. Ward and offer an interesting study of the possible social evolution, but these presentations rarely give consideration of the fundamental domination of fire on social structures. The procuring, preparation, and preservation of food, transportation by land and water, and to some extent shelter are essentials to migration irrespective of environment, but give rise to arts which are largely reflexes of environment. The use of fire has a tendency to render all environments uniform as to many essentials. Food has been mentioned and it may be perceived that in the procuring and shaping of masses of wood for boat building and for other purposes, fire plays an important role.

It may be presumed that migration by land preceded movements by water, since experiments in flotation beginning with swimming would require a long time before the evolution of boats, which would first be suitable for rivers and with greater knowledge on the part of man be made capable of taking ocean voyages. The conquest of the hydrosphere by means of boats is now seen to have been analogous to the conquest of the atmosphere by balloons and aeroplanes. Thus extensive oversea migrations are later than land migrations and the western hemisphere would be populated from Asia long before Polynesia, and other sea migration, granting that migrants could have crossed the great reach of over 12,000 miles between Easter island and Peru.

It is easy for peoples possessing an art to affirm by a simple effort of reasoning that at a former time they did not possess this art. This statement is common among uncivilized men in regard to fire; hence, caution must be exercised lest it be taken for a transmission of a memory of such a time. Especially is this so because the acquisition of fire by man reverts to such a remote antiquity that no transmission of the experience seems humanly possible. It is observed that the most primitive tribes contemplate the past and fill it with myths of cruder conditions. At what period of advancement man looks to the future it is difficult to say, but the grade of

culture would be high. For a long period the past was regarded as a golden age, an epoch of communication with the gods and at the close of this period comes a severe philosophy that regulates the past on terms of evolution from simple to complex and looks to the future as a logical field for advances. The savage and uncivilized tend to be static and their education is only effected by contact, migration, admixture, and stress of environment, bringing into play dormant faculties of invention and adaptation.

Perhaps migration began with the necessity for following seasonal changes of the food supply, or unusual dislocations of this supply by drought, storm, plant diseases, or other natural causes. These causes as well as cataclysms have been known to influence the movement of peoples, and their natural or enforced migrations might well have produced a limited distribution of peoples before the use of fire. These migrations in the twilight zone when primitive man was still in the grasp of nature offer a legitimate field for the exercise of the scientific imagination, but a more definite starting point is with man in possession of the primal fire. The object of this paper is to suggest that migration was vitally influenced not so much by the utilization of fire, which might tend to induce a static condition, but rather that the invention of fire-making at will powerfully accelerated the voluntary distribution of man over the earth.

Dr. Richard L. Garner, whose acquaintance with the anthropoids is second to that of no other man, informs me that the gorilla, in a state of nature, lives on sour and bitter foods, rejecting sweets. Dr. Garner has superintended the education of a gorilla and observed the acquisition by the animal of a taste for sweets and cooked food, both animal and vegetal, with a final rejection of raw food on the part of the animal. He has also observed that this change of habits apparently produces a change in the disposition of the animal which manifests itself in an amelioration of its disposition and a quickening of its intelligence.

There is no disposition to regard the gorilla as a basis for theories as to the state of primitive man since this animal represents another development and does not stand in the line of the evolution of man. Clues, however, may be derived from a study of his habits as to the

state of primitive man who differs from the gorilla or from any of the anthropoids not only in genealogy and physical development but especially in the possession of a receptive and plastic mind reacting on capable hands and other moving powers.

It will be seen therefore from knowledge derived from a study of animals that the genus *homo* is very mutable and the difficulties that present themselves in regard to the classification of races which give rise to so many divisions of man grow out of endless mutations. It is known also from the study of animals that races readily form or form anew and that under given conditions a race resumes its purity. This constant flux and reflux accounts for any number of changes from a primitive ancestor to the races of today and it appears as a corollary that there is a greater fixity of inventions of man than of man himself. Inventions like that of fire-making would seem therefore to preserve a stricter lineage than social groups of man. It may be said also that inventions that deal with exterior nature are more fixed than those connected with man's physical structure as language, or artificial physical modifications such as deformities for ornament and other purposes. It will be seen also that the acquirement of fire inaugurates the science of cultural anthropology, that vast complex which is the record of man's material activities.

We can affirm in consideration of the foregoing that the invention of fire-making is more radical than any other thing that has happened to man, that it may have accelerated the mutations he has undergone, and without this invention his extended migration over the earth as well as his advancement would have been well nigh impossible.

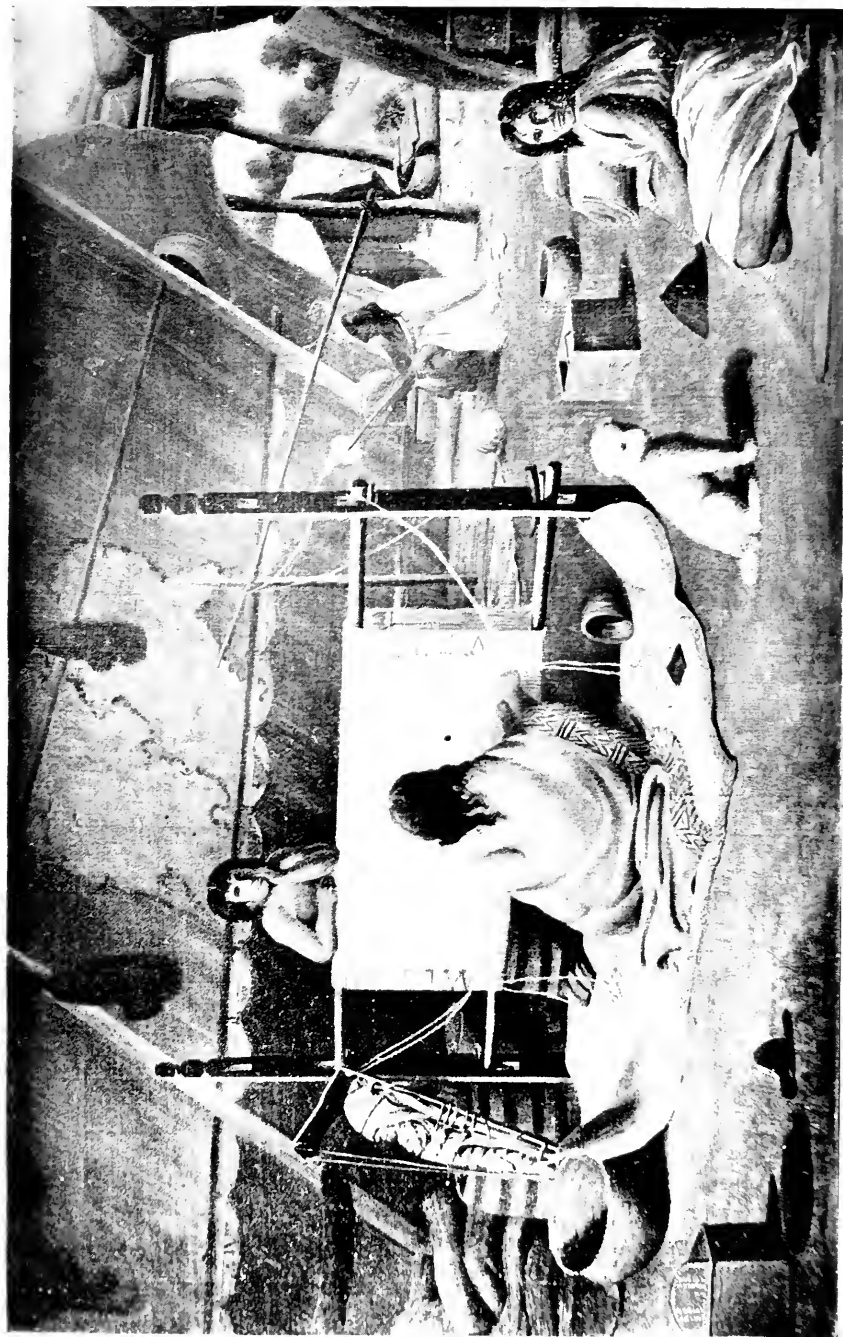
U. S. NATIONAL MUSEUM,
WASHINGTON, D. C.

A NEW TYPE OF SPINNING IN NORTH AMERICA

By MARY LOIS KISSELL

WHILE assembling the material for a forthcoming publication on the "Indian blanket of the northwest," under the joint authorship of Dr. C. F. Newcombe, James Teit, and the writer, a unique manner of spinning was noted among two of the Salish tribes. It is a method quite different from any previously described from peoples of lower culture either in America, or in other parts of the world. This mode of spinning in all probability furnished the yarn for at least three of the seven distinct types of blankets made by the Indians of the Northwest. Of the older examples of these, only a few remain scattered in the museums of America and Europe, where there is nothing on record concerning them save that they were collected by Captain Cook, or some early explorer. It is the unusual character of these rare old blankets, some kinds of which have not been made in the last half century, that first aroused an interest which led to a general study of blankets from this area. This interest resulted in a union with the two authorities, Dr. Newcombe, known for his wide acquaintance with the Indians of the Northwest Coast and James Teit, eminent in his knowledge of the Indians on the northwestern plateau, on a publication which it is hoped will be a valuable contribution to the subject.

To return to the spinning: the unrecorded type was found in three Cowichan villages, Nanaimo and Kockasailo on Vancouver island, and Musqueam on the mainland; as well as in the two Thompson villages, Yale and Spuzzam. As is generally known, primitive people produce yarn in two ways; without a device or with a spindle. It is the second that concerns us here, since it is the manner of using this spinning device which differs from its use in other localities. Spindle spinning has heretofore been thought to be of two kinds: spinning with a free spindle, that is, one twirling



REPRODUCED FROM A PRINT OF AN OIL PAINTING BY PAUL KANE IN 1846. THE SPINNING IS TO BE SEEN IN THE BACKGROUND AT THE RIGHT



in the air unsupported by other than the twisting yarn; and spinning with a sustained spindle, that is one which revolves upon some surface. The first was largely employed during early days in the Old World, and today in South America; the second is found in North America, Mexico, Central America, and some parts of Asia, Africa, and the Pacific islands. The spinning of the Cowichan and Thompson Indians belongs to neither of these types, it is a third mode of spindle use entirely unique, a description of which will make this clear.

As modern practice differs slightly from that of the old days, the early method of spinning in these two tribes will be described and then present day changes will be given. The preliminary preparation for spinning consists of rolling the wool with the palm over the thigh, splicing on more wool, and so continuing the rolling and splicing until a long loosely made roving is furnished, which as completed is passed into a basket, or a box, or if neither are at hand, to a pile at the spinner's side. One end of the roving is now run through the tension ring, a little circle of wickerwork, or a small wooden or stone form pierced by a round hole. Previous to making the roving, the spinner has suspended the tension ring from the ceiling by means of a cord, or attached it high on the wall, so as to give a long stretch between it and the spindle. Some spinners do not employ a tension ring, but throw the roving over the tall loom frame to give the necessary tension for drawing, as illustrated in a Field Museum print from an old picture made by Paul Kane fifty years ago (pl. xvi). After proceeding through the tension ring or over the loom frame, the end of the roving is tightly twisted for a short distance between the palms and then attached to the upper arm of the spindle shaft near the whorl. Everything having been made ready, the spinner squats upon a mat on the floor and with outstretched arms raises the huge spindle to an oblique position by grasping its lower end in the palm of her left hand and clasping its shaft a little below the whorl in her right. The twirling might be termed a tossing motion which is performed by the upturned palm of the right hand. When the roving has received the required amount of twist the upper end of the spindle is swung

upward and backward, thus bringing the next draft of roving through the tension ring and permitting, after the spindle end is again dropped to position, that the loosely sagging and already twisted yarn be wound upon the spindle. This is accomplished by lacing the yarn back and forth in large oval coils on the upper arm of the shaft as the spindle is lifted and lowered from the oblique to the vertical and from the vertical to the oblique while it is still revolving. After the stretch of completed yarn is wound on the shaft the spinner returns to the twirling motion that the freshly drawn roving may be twisted, when it is wound on the shaft as before described. So the spinning continues until the spindle is full, after which the yarn is unwound into a basket and later wound into great balls. It is the custom of some spinners to introduce a second winding between the lacing on the shaft and the ball making, when small portions of the yarn from time to time are unwound from the shaft and then tightly rewound with the hand in regular spool fashion, before continuing to twist more roving.

The few modifications in this old manner of spinning are due to the influx of civilization, which has introduced the chair among other modern conveniences. Upon this the spinner of today sits, while the back of a second chair serves as a substitute for the old drawing devices, the tension ring and the loom frame, since over the top edge of its back the roving is drawn. The lowering of the point of tension and the raising of the spindle bring the stretch of roving to a more nearly horizontal position (figure 27) and also do away with the tiresome upward stretching of the arms before necessary, besides allowing an easy steadying of the right elbow upon the knee. However, this shorter and less oblique stretch of the roving materially affects the quality of the yarn and results in a much coarser product than that of former times. But in the days of old there was a need for better yarn for the construction of finer blankets, a need which is now supplied by modern trade.

Wool spinning whether of sheep wool, or as here of the mountain goat, includes three processes;¹ first drawing, or arranging

¹ Blümner, H., *Technologie und Terminologie der Gewerbe und Künste bei Griechen und Römern*, I. s. 112.

the fibers in parallel order by extending or drawing out a small mass of raw wool (a process in modern manufacturing called drafting); second, twisting, or uniting these parallel fibers by twisting them about each other; and third, winding, or taking care of the twisted yarn. All these processes may be carried on by hand, very slowly it is true, but very successfully as do the Tlingit Indians¹ who spin the mountain goat wool for their Chilkat blankets by drawing by hand, twisting with the palm on the thigh, and winding the spun yarn into balls; or, as do the nomads of the African Steppes of Wad-Draa,² who spin coarse yarn for their tents and mats of



FIG. 27. Photograph taken by Dr. C. F. Newcombe at Musqueam, 1915.

sheep wool by drawing and twisting as the Tlingit and then winding the yarn, as it is twisted, upon the bare foot, after first securing it to the big toe. Strange as it may seem, the Tlingit spinner can produce by hand a yarn that is many times finer, than can her not far distant neighbor, the Cowichan spinner make with the spindle.

¹ Emmons, G. T., "The Chilkat blanket," *American Museum, Mem.* III, 334.

² Jannasch, R., "Die Textilindustrie bei den Ur- und Naturvölkern," *Berliner Gesellschaft für Anthropologie*, XX, s. 85.

When the spinning processes are considered in relation to their progression, the Cowichan and Thompson Indian method is the most elementary use of the spindle, since the three processes follow one another in succession, no two taking place at the same time. With sustained spindle spinning the drawing is done by one hand at the time the twisting is being carried on by the other; with free spindle spinning the drawing is accomplished by both hand and spindle, taking place simultaneously with the twisting. Here the spinner first drafts the roving by pulling it through the tension ring, and then twists it with the spindle.

Also in their manipulation, the spinning processes here are in an undeveloped state. What can be more primitive when one wishes to draw out or extend a thing than to attach one end and then pull? Exactly in this way is the wool roving drawn through the tension ring and this retards its passage just enough to give the necessary draft to the roving, a method quite in contrast to the deft handling during the drawing for sustained and free spindle spinning. Another novelty is the direction in movement of the roving which is drawn toward the spinner instead of away, as in other spindle spinning. A single exception to this is the ancient Egyptian method where the roving is brought from a receptacle either in front of, or behind the spinner, as shown on tombs fifteen and seventeen, Beni Hasan, and tomb two, Tehuti-hetep.¹ However, only in one case is the method employed where the roving is twisted before turning away from the spinner and this is in twine making rather than yarn making. The manner of twisting the roving by the Cowichan and Thompson Indians is most elemental, that of twirling the spindle while grasping it in the hands. There are simpler spindles to be found in remote places in Asia and Europe, where the raw material to be spun is tied about a stick or a stone and then revolved.

Coles² illustrates an ancient Scottish stone spindle, but one that is shaped into slender pyramidal form and with the usual

¹ Newberry, P. E., *Beni Hasan*, I, Pl. 29; II, Pl. 4, 13; *El Bersheh*, I, Pl. 26; Warden, A. J., *The linen trade ancient and modern*, p. 211.

² Coles, F. R., "Decoration of Scottish spindles," *Reliquary and illustrated archaeologist*, V, p. 80.

slip-knot tying of the yarn at its upper end so common on European spindles. Certain Asiatics fasten two small sticks together to form a cross and employ this as a free spindle. But these rude forms both of stone and crossed sticks belong to a more advanced method of spindle use as before noted, since the free spindle serves the double function of drawing and twisting. When turning this Indian spindle the power is applied from below instead of above as with most spindles, for here the upper or spinning end is pointed away from the spinner. Neither during the turning is it at any time free from the grasp of the spinner, but constantly held in the hands. This and the lack of a steady base causes a loss of centrifugal power which greatly retards the motion. Thus the rank in spindle manipulation of this type is below both the free spindle revolving in the air which is almost devoid of friction; and the vertical sustained spindle with friction at its point only.

By reason of the foregoing crudities in method, yarn making with this type of spindle is slower than that with other spindles. The processes are not only slow but the product is of low grade, for only coarse yarn can be so spun. The raw material, it is true, does influence the finished yarn to some degree, because of the harsh character of mountain goat wool and of dog hair which formerly was mixed with the wool. Similarly the ancient yarn of wool and cow hair in northern Europe during the bronze age was coarse and harsh although spun with the free spindle.¹

The method of preparing the raw material for spinning is similar to that employed by many peoples of lower culture, a rolling on the thigh. The early Egyptians prepared their raw material on a flat stone,² and the ancient Greeks made a knee cap of pottery upon which to prepare the roving. Two beautiful examples of the pottery "Onos" may be seen in the Greek vase hall of the Metropolitan Museum of Art. It is an implement about a foot long, of hollow cylindrical hood shape to fit the knee and used in this way by the Athenian spinners of the second half of the sixth century B. C.

The spindle employed in this third type of spinning has been

¹ Montelius, O., *Civilization of Sweden in heathen times*, p. 59.

² Newberry, P. E., *Beni Hasan*, I, Pl. 29; II, Pl. 4, 13.

recorded by a number of writers. It is a huge form, the largest hand spindle now known, with a shaft averaging four feet in length and a whorl eight inches in diameter. Formerly designs were carved on the whorl of maple wood, for as with many peoples the desire was strong to express beauty, or information, or both. Of the many decorated whorls in different parts of the world, perhaps the ivory, amber, and pottery whorls of the old Greeks and Romans are the most beautiful.¹ The weight of the spindle must always receive careful attention, especially in free spindle spinning of wool. There the spindle hangs on the roving so the weight materially influences the drawing,² but here the weight is supported in the hands.

As far as now known, this new type of spinning is an isolated type since the neighboring tribes who spin with the spindle use the small sustained type of the Southwest. The Kwakiutl of the coast to the north and the west give momentum to the sustained spindle by rubbing it along the shin;³ while the Nootka to the west formerly used a similar spindle but twirled it between the thumb and first finger, if we can trust to scattered reports. The conflicting report made by Professor Boas twenty-five years ago⁴ concerning the method of spinning by the Salish at Saanich, Vancouver island, can be easily accounted for. It is quite possible that some visiting Indian had employed the borrowed method of the Nootka and transferred it to the huge spindle of the Salish. All reports now from that locality indicate that this newly described type of spinning was the native method of the Cowichan.

¹ Forrer, R., *Reallexikon der prähistorischen klassischen und frühchristlichen Altertümer*, s. 754. Kimakowicz-Winnicki, "Spinn- und Weberwerkzeuge in Europas." *Mannus Bibliothek*, No. 2, s. 11, 24; *Darstellung über früh und vorgeschichtliche Kultur-Kunst und Völkerentwicklung*, Heft 2, s. 11, 24.

² Gotze, A., "Das Spinnen mit Spindel und Wirtel," *Berliner Gesellschaft für Anthropologie*, 1896, s. 473. Sokeland, H., "Das Spinnen mit Spindel und Wirtel," *Berliner Gesellschaft für Anthropologie*, 1897, s. 95.

³ Boas, F., "The Kwakiutl of Vancouver Island." *Mem. Am. Museum*, V, Pl. II, p. 373.

⁴ Boas, F., "Report British Asso. Advancement of Sci.," 1890, p. 566.

REMNANTS OF THE MACHAPUNGA INDIANS OF NORTH CAROLINA

By FRANK G. SPECK

ON Roanoke island and some of the adjacent sand islands and on the mainland of Dare and Hyde counties on the coast of North Carolina are a few families of mixed-blood, descendants of the local Indian tribes. Having recently visited these people to rescue, if possible, some facts concerning their early culture and language, I should like to make available to ethnologists the results of my trip, meager as they are.

According to the accounts furnished by Raleigh's Expedition,¹ being the earliest notice that we have of these tribes, the region between Albemarle and Pamlico sound was the home of the Secotan Indians. John White, the artist of Raleigh's expedition, gives some sketches of these people, who, from the evidence of a few place names, and through their relationship to the Weapemeoc and Pamlico bands, of whose language Lawson has left us a vocabulary, we know to be Algonkian, probably one of the southward drifting branches from the Powhatan group of Virginia. Lawson in 1714² has left us some more information bearing on these tribes, while the colonial documents of North Carolina contain a few later notices. Lawson names several local bands inhabiting the area embraced within the territory designated by White as Secotan, among them the Hatteras band occupying the sand banks off the coast, and the Machapunga on the mainland, near Mattamuskeet lake. After the expulsion of the Tuscarora from North Carolina the coast tribes seem to have faded from history and, so far as I can find, we have no definite mention of them in the nineteenth century. Whether the bulk of these natives actually joined the

¹ *Narrative of the First English Plantation of Virginia*, Thomas Hariot, London, 1588—Quaritch Edition, 1893.

² *The History of North Carolina*, John Lawson, London, 1714. Raleigh, 1860.

migrations of the Tuscarora and the Siouan tribes to the north, or whether they scattered and became merged with the negroes and whites, we are at a loss to conclude.

A visit to their old home, however, and persistent inquiry among the settlers of Albemarle and Pamlico sounds, brought to knowledge a few individuals who are descended from Indians who came originally from Pungo river near Mattamuskeet lake, Hyde county. These are evidently remnants of the Machapunga tribe who have left their name to Pungo river. Those whom I met traced their descent from one Israel Pierce, who was known as a Pungo river Indian. That English Christian names were common among the tribes of this general region as early as 1718, is shown by a list of chief's names from the Chowan Indians, neighbors of the Machapunga, given in the colonial documents.¹ I traced Pierce's descendants through Mrs. M. H. Pugh, Pierce's granddaughter, now a very old woman, estimating her age to be about eighty years, who was born and raised in the Pungo river district. Later in her life she moved to Hatteras island. She has four sons, daughters, and numerous grandchildren. At present the dark-skinned people living on Roanoke, Hatteras, and other neighboring islands of the Pugh, Daniels, and Berry families, largely of negro blood, and some of those named Westcott, of a lighter strain, are of this blood.

In appearance they vary greatly, from individuals with pronounced Indian characteristics, through people with noticeable white or negro features, the latter sort predominating in the younger generations. Not one of these people knew a single word of the Indian language and not one knew of any definite Indian customs or traditions, not even the name of their tribe. Unconsciously, however, the natives, in the real sense of the term, are preserving some phases of Indian culture in their present economic life, which is, of course, inseparably associated with local environment. One of these features is fishing; an activity carried on nowadays by the usual methods of the white people. The Machapunga were men-

¹ *North Carolina Colonial Records*, Vol. IV, p. 33-5. Thomas Hoytes, James Bennett, Chas. Beasley, Jeremiah Pushing, chief men of the Chowan Indians who sold land to the settlers in 1713.

tioned in 1713 as expert watermen.¹ The natives, however, make their own nets, the tools of construction being similar to those used by both the white people and the Indians of the Atlantic coast. Some specimens of nets of different sized meshes for herring, drum, and shad, of netting needles for these, and of floats, were obtained from the Indians. Hunting deer, bear, wild turkey, and other wild game is still carried on in the immense swamps of eastern North Carolina, while besides nomadic pursuits, some agriculture is followed. As to native industrial arts, however, everything is gone; basketry being the last art to survive. Until recently, native baskets were made of hickory and oak splints, in the manner prevailing among all the Iroquoian and Algonkian bands of the east. Unfortunately, all actual traces of native culture have been lost among these descendants.

Needless to say, my hopes of finding some remembrance of the ancient family hunting territories which occur in all Algonkian areas where a nomadic hunting life prevails, were futile. I had been led to hope that the wildness of the country and the importance of hunting and fishing along the sparsely settled Carolina coast might have caused the territorial institution to survive.

At such times of the year when they resort to the outlying sandbanks where numbers of half wild ponies are still maintained as a source of supply for the settlers, the natives construct camps of palmetto leaves supported on cross poles. These shelters probably follow the plan of the early Indian palmetto structures. A few items of folklore gleaned from the people may have a native foundation. It is believed that the bite of a rattlesnake may be cured by eating a piece of the snake.

The Yupon bush (*Ilex cassine*) assumes large proportions in this low country and bears an abundance of leaves which remain green all winter. These leaves are dried and steeped to form a tea, which is conspicuous as a regular beverage, thought to have some beneficial medicinal qualities among the people of the locality.

In order to assemble the few specific references to the Machapunga available in the literature of the region, I will quote Lawson's

¹ *North Carolina Colonial Records*, Vol. II, p. 45.

remarks on the tribe. He states that in his time, about 1701, the Machapunga had one town, called Maramuskeet (Mattamuskeet) containing thirty fighting men.¹

Moreover, several customs are found in some families which others keep not; as for example, two families of the Machapunga Indians use the Jewish custom of circumcision, and the rest do not, neither did I ever know any others amongst the Indians that practiced any such thing, and perhaps if you ask them what is the reason they do so, they will make you no answer, which is as much as to say, "I will not tell you."²

Another instance was between the Machapunga Indians and the Coranines (evidently the Corees, who, with the Machapunga later became allies of the Tuscarora) on the sand banks; which was as follows: The Machapunga were invited to a feast by the Coranines; which two nations had been a long time at war together and had lately concluded a peace. Thereupon, the Machapunga Indians took advantage of coming to the Coranines' feast, which was to avoid all suspicion; and their king who, if a savage, is a great politician and very stout, ordered all his men to carry their tomahawks along with them, hidden under their match coats; which they did, and being acquainted when to fall on, by the word given, they all set forward for the feast and came to the Coranine town, where they had gotten victuals, flint and such things as made an Indian entertainment all ready to make these new friends welcome; which they did, and after dinner, towards the evening they went to dancing. . . . So when the Machapunga king saw the best opportunity offer, he gave the word and his men pulled their tomahawks from under the match coats and killed several, and took the rest prisoners.³

Several entries in the State records of North Carolina have a bearing upon the Machapunga, who were also often known as Mattamuskeets, derived from the name of their principal village.

During the Tuscarora war, 1712-1713, the Machapunga, it seems, took sides against the colonists and, together with their neighbors the Corees, went on record several times for their activities. De Graffenried's Manuscript Journal mentions the "Marmusckits" as partaking in plunder and robbery with part of the Tuscarora Nation.⁴ In 1713, they killed and carried away about twenty persons at Roanoke island and at Croatan.⁵ Again the

¹ Lawson, p. 383.

² Lawson, p. 341.

³ Lawson, p. 325.

⁴ *North Carolina Colonial Records*, Vol. I, p. 933.

⁵ *Ibid.*, Vol. II, p. 31.

"Mattamuskeets, Catechnee and Corees warriors number about fifty, attacking Alligator River."¹ The "Mattamuskeets have advantage of such dismal swamps to fly into." The English came to realize that they had to depend upon auxiliary Indians to drive them out or to place a garrison near them "to hinder them making corn, or discover where they keep their wives and children as a means to make them remove."² Subsequently, it appears, that the part of the Tuscarora under King Blount, who were friendly to the English, were largely responsible for the destruction of the hostile Mattamuskeets.³ The latter with the "Corees and other enemy Indians" concluded peace February 11th, 1715, and "have liberty to settle at Mattamuskeet."⁴ An overseer was appointed to reside among them. By 1731, the "Maremuskeets" were among the tribes that did not number more than twenty families. And again in 1753, we find an estimate stating that the Mattamuskeets and other Indians on the islands or "Banks" number some fifteen or twenty.⁵

After all, despite the little that can be gathered concerning these extreme southerly Algonkian, one or two conclusions, I think, may be drawn. One is, that the Machapunga, Pamlico, Chowan and probably the Neuse Indians were ethnically a branch of the Powhatan group. Their range extended southwardly along the coast as far as the territory of the Iroquoian and eastern Siouan tribes with whom apparently they were at first unfriendly. Their numerical paucity is another fact denoted by historical references. Consequently, taking these facts into consideration, I feel warranted in inferring that the Carolina Algonkians were comparatively recent intruders into the region and formed the last offshoot of the general Algonkian movement southwards along the Atlantic coast. Step by step, it seems wherever the advancing bands settled down, the migration appears to have been continued later by a smaller

¹ *Ibid.*, p. 39.

² *Ibid.*, p. 39-40.

³ *Ibid.*, p. 74.

⁴ *Ibid.*, p. 168.

⁵ *Ibid.*, Vol. V, p. xli.

offshoot, until the moving force had expended itself. The southward Atlantic drift, illustrated by the Carolina group, is indeed in harmony with a general Algonkian migratory tendency which I have already dealt with in the case of the Micmac, Ojibwa, and Naskapi.⁴

⁴ "The Family Hunting Territories and Social Life of Various Algonkian Bands of the Ottawa Valley," *Memoir 70 (Anthropological Series, no. 8), Geological Survey of Canada, Ottawa.*

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BOOK REVIEWS

METHODS AND PRINCIPLES

Introduction to the History of Religions. CRAWFORD HOWELL TOY, Professor Emeritus, Harvard University. Ginn and Company: Boston, New York, Chicago, London, 1913. Handbooks on the History of Religions, vol. iv. Ed. by Morris Jastrow. Pp. 639.

The announced object of the book is "to describe the principal customs and ideas that underlie all public religion." After an introductory chapter on the nature of religion, the soul, early cults and ceremonies, totemism and taboos, gods, myths and magic, the higher theistic and social developments of religion, are treated. The literature of the subject has been thoroughly examined as appears from the numerous references scattered through the book and the long bibliography at the end.

For the ordinary scholarly reader and student with the current views concerning the less advanced peoples and their psychology this book ought to prove thoroughly satisfactory. The few ethnologists who have had field experience and intimate contact with the peoples chiefly concerned in the subject matter of the book will of course have many doubts as they turn the pages. For one thing, they will doubt the value of many of the documents cited as the sources of the information given. It is not an easy thing to know the religious ideas of an alien people, usually a people speaking an unknown language. They know, too, that many of the terms used, such as totemism, animism, gods, and demons, do not stand for blocks of stone of uniform substance and size, capable of being combined into artistic and stable structures. To them they are parts of the bedrock of life which split off with uneven cleavage into blocks of all sizes and shapes.

Not only is totemism one thing in Australia and another on the Northwest Coast of America, but each reader gives to this term a value for himself different from that entertained by others. To be sure, these difficulties are encountered whenever it is attempted to represent any mass of objective facts in a comprehensible way in a written treatise. But somehow religion and especially, "all public religion," particularly "the ideas" underlying, does seem a stupendous task to one who realizes how difficult it is to learn much about any one particular religious system.

Ethnological field workers better be content in adding to the difficulty of writing such books as this by piling up a greater mass of conflicting data from the peoples with whom they are thrown.

PLINY E. GODDARD

NORTH AMERICA

The Family Hunting Band as the Basis of Algonkian Social Organization (American Anthropologist, N.S., vol. 17, 1915, pp. 289-305). F. G. SPECK.

Family Hunting Territories and Social Life of Various Algonkian Bands of the Ottawa Valley. F. G. SPECK. (Geological Survey, Canada. Memoir 70. No. 8. Anthropological Series.) Ottawa, 1915.

It is but seldom that a purely descriptive ethnological monograph commands attention as of peculiar significance, over and above the concrete data contained in it. Such is the case, however, with both of Dr. Speck's studies of the family hunting territories among the Algonkian Indians. The studies are brief, in part vague, almost fragmentary; nevertheless the specific contribution which they bring is definite and carries conviction. The concept of "family hunting territory" has come to stay. It is, therefore, scarcely too much to say that in their theoretical significance for the study of social organization, Dr. Speck's monographs may be designated as epoch-making.

The tribes dealt with specifically to date embrace the Dumoine, Kipawa, Timiskaming, Timagami, Mattagami, Whitefish, Penobscot, and Micmac. Among all of these the family hunting territories are found. A map is appended to the Geological Survey monograph on which the hunting territories of the first six of the above bands were traced by Dr. Speck's informants. Here a question arises: to what extent are the outlines of the territories as given on the map due to interpolation? We read that brooks, rivers, rocks, lakes, were used as delimiting features of territories. It would be of great interest to learn just what specific features were used by the Indians in constructing the map, in other words, what was the mechanism of its making? Dr. Speck has already carried his investigations to other tribes and promises further maps.

Another point calls for further elucidation. We are to understand that the paternal families comprise blood relatives, but also women married to the men of the family and adopted persons. The families have names, usually nicknames, among the Penobscot animal names. Now, does a woman after marriage assume the family name of her

husband, or does she keep her father's family name? I gather from the context that the former assumption is correct, but no room for misunderstanding should be left in a point of such importance.

The bearing of this appears particularly in the case of the Penobscot whose organization differs from that of the other tribes described in so far as the family groups here assume animal names, have a myth which represents the members of the group as closely related to their eponym, believe in psychic and even physical similarity between family members and their eponymous beasts, etc. Clearly, we have here a peculiar type of totemism, the families taking the place of the totemic clan or gens. But is the totemism strictly hereditary or is it so only in the case of the man, whereas the woman belongs to her father's family and totem only until her marriage? On the answer depends whether we shall have to regard the Penobscot as organized into strictly hereditary paternal families, in which case there would be intersecting totemic groups, practically gentes, or into paternal families not strictly hereditary, in which case the family and totemic units would coincide. The latter seems to be the case, but again a definite statement is imperative.

The Algonkian families, with their hunting territories, seem to constitute an intermediate link—in the analytical, not necessarily the historical sense—between the tribes with the so-called loose social organization, such as the Eskimo or the tribes of the Plateau area, and the tribes with the strictly hereditary and clearly defined social units, as represented in the Northwest, Southwest, Northeast, Southeast, and among the Southern Siouans. In view of this fact, the danger lies near, and perhaps Dr. Speck has not altogether escaped it,—of confusing the hunting territories of the Algonkian with the much less definite tendencies towards group prerogatives in hunting and fishing places which are so very common among the Indian tribes of loose, as well as of definite, social structure.

The author's data also provide interesting glimpses into the dynamic aspects of the situation. Hunting territories become subdivided through the hereditary assignment of sections of a territory to several brothers upon the death of their fathers. On the other hand, when a family becomes extinct in the male line, the territory is subdivided among relatives, thus leading to accretions in their holdings.

The relation between the families, on the one hand, and the totemic clans, on the other, is highly instructive. The data bearing on this point will be found in the Geological Survey monograph. It seems obvious that the paternal family is the social unit *par excellence*, whereas the gens,

while regulating exogamy, is of relatively slight importance. Dr. Speck is probably right in ascribing the gens in this district to Ojibwa influence; and the mechanism he suggests, infiltration through intermarriage, seems adequate to account for the facts. But here again specific illustrations, if available, would be most welcome. However that may be, the Algonkian situation is certainly most illuminating, and impresses one somewhat as a *verkehrte Welt*, for whenever families coexist with clans or gentes one is accustomed to find that the latter units reign supreme.

Many details supplied by the author bespeak the rational and teleological character of the institution he describes. Thus, the large islands on Lake Timiskaming were regarded as "common property, or more properly reserves, to be occupied and hunted on when the families came together in the spring for the social re-union" (*Memoir*, p. 5). The most surprising data are those referring to the "farming" of animals. We are told that,

the game was kept account of very closely, so that proprietors knew about how abundant each kind of animal was, and hence could regulate the killing so as not to deplete the stock. Beaver were made the object of the most careful "farming," the numbers of occupants, old and young, to each "cabin" being kept count of. In certain districts, moose, or caribou, were protected during one year, in other districts the next year. The killing of game was regulated by each family according to its own rules (*Memoir*, p. 5).

Although supported in substance by the speech of Chief Aleck Paul (*American Anthropologist*, pp. 294-5), the above statement obviously presents but an approximation to the truth and must, on the whole, be regarded as an exaggeration. Particularly when the hunting territory is several hundred, or even a couple of thousand square miles in extent, the Indian proprietors cannot be conceived as having even an approximate knowledge of the available numbers of a particular kind of animal. On this, as on some of the other topics presented in Dr. Speck's papers, more definite information is sorely needed. But even in their present somewhat tentative form these data on aboriginal gaming rules constitute a most fascinating chapter in the Indian's book of knowledge.

Before closing, I should like to repeat most emphatically that Dr. Speck is to be congratulated upon these significant results of his researches. Ethnologists will eagerly look forward to still other publications on the same topic. May there be many of them!

A. A. GOLDENWEISER

Family Hunting Territories and Social Life of Various Algonkian Bands of the Ottawa Valley. F. G. SPECK. (Memoir 70, No. 8, Anthropological Series of the Publications of the Geological Survey of Canada.) Ottawa, 1915.

Myths and Folk-lore of the Timiskaming Algonquin and Timagami Ojibwa. F. G. SPECK. (Memoir 71, No. 9, Anthropological Series of the Publications of the Geological Survey of Canada.) Ottawa, 1915.

I am sure all American ethnologists are glad to see that the eastern part of Canada and America is at last receiving the attention of field investigators. That the ethnological department of the Geological Survey of Canada realizes the importance of this area is shown by the fact, that six of the nine memoirs, so far published, deal with either the Eastern Algonkin or Iroquois. To Dr. Speck more than any other investigator we owe our recent knowledge of this region, for he has already published four memoirs on the Eastern Algonkin and has another ready for press; not to speak of his work on the Penobscot, which I suppose we may hope to see in the near future.

In the first of these memoirs under discussion Dr. Speck describes the Hunting Territories and Social Life of the Bands of the Ottawa Valley. It is not worth discussing the ethnology and inter-tribal relations, which Dr. Speck treats in the first two sections for he says that he is "trying to prepare" a paper on that subject. On pages four to eight Dr. Speck deals with hunting territories of the Timiskaming Indians. It is evident that Dr. Speck realizes the "sketchiness" of this part of the paper for he says that his information about the Timiskaming band is not of so high a grade as that secured from the Timagami band. His treatment of marriage is perhaps more inadequate than his treatment of the other aspects of their social life. In fact his whole treatment of the Timiskaming band is little more than an attempt to enumerate the hunting territories of this region, and his table would be of considerably more value if he gave the number of members of each family. His treatment of the Dumoine River and Kipawa bands is too inadequate to bear criticism.

In Chapter III Dr. Speck describes the hunting territories and social life of the Timagami band of Ojibwa. His data on the hunting territories is a real contribution to knowledge and he seems to have planned and carried out his investigation on this topic with care. He probably thought that it would not be necessary to enter into details concerning the clans and totems of this people, since they are a division of the Ojibwa, nevertheless a more extensive account of these topics as well as of "wisana"

would have been desirable. On the whole it would have been better if Dr. Speck had not dispersed his energies so much but had treated more carefully one or two topics—for example, the kinship system and hunting territories—for it seems almost impossible to treat the social organization of these tribes in twenty-nine pages.

Of the second Memoir under discussion the first twenty-nine pages are devoted to the myths and folklore of the Timiskaming Algonquin, and the remaining fifty-eight pages to the myths and folklore of the Timagami Ojibwa. They are a substantial contribution to the general folklore of the region, but the collection is too small to solve many problems. Dr. Speck's style is not always lucid and his meaning is not always clear, as, for example, when he speaks of "the men and women in no particular order, forming a large circle, with their leader at their head." However, it is not worth while enumerating slips of this sort, which, as we all know, are very easy to make when writing in haste.

WM. HUBBS-MECHLING

Composition of California Shellmounds. EDWARD WINSLOW GIFFORD.

(University of California Publications in American Archaeology and Ethnology, vol. 12, no. 1, February 24, 1916.) 29 pp., map.

At the present time any contribution to archeological method is of appreciable value. Mr. Gifford's suggestive treatment of the California shellmounds by a mechanical analysis has brought forth results bearing directly on the constituents of the mounds, the proportion of these constituents at various depths in the mounds, and inferentially the circumstances of shellmound growth and their age. With a full appreciation of the difficulties that beset such inferences, we have ventured to review those which appear not to have been adequately controlled by a full use of the data.

The data resulting from the mechanical analysis are presented in the first section of this paper. These represent the constituents of the mounds—vertebrate and shell remains, inorganic matter, and the products of combustion—in percentages by weight of the total mound content and percentages of each constituent for each interval of depth. A further analysis of the shell content gives an expression for each mound of the proportions of each molluscan species therein and the percentage composition according to depth for certain species.

The relative proportions of the molluscan species in the total content of the mounds should serve as an index of the environment of the mounds during the period of growth, provided we assume the same ratio of their

occurrence at all depths in the mounds. Mr. Gifford's general inference is as follows:—

No evidence of change of environment is afforded by the results of the analyses. The definite facts established point the other way: that is, toward the continuity throughout shell-mound times of the conditions as they were at the coming of the white man.

Those variations which would invalidate the assumption of uniformity of composition are explained by Mr. Gifford as "nothing but instances of the mound-dwellers' overtaxing the supply of one particular shell species and thus being forced to rely more on other species." This explanation seems to be valid, and its certainty is increased by the fact that some of the inferred variations appear to be far-fetched.

Certain features of the calculation of mound age must be approached with a critical attitude. The formula used in this calculation is as follows:—

$$\frac{\text{Total weight of shell or ash}}{\text{Weight per person per day} \times \text{Population}} = \text{Time of mound growth.}$$

This formula is applied to two mounds, Ellis Landing and Emeryville, evidently chosen because their total volumes were known. In an earlier calculation, based on the volume of the Ellis Landing mound, Nelson, assuming that a constant average of 100 persons consumed 50 shellfish each per day, concluded that the period of mound growth approximated 3,500 years. Substituting this time and population in the formula, Gifford finds that the rate of mound accumulation was 0.56 pounds of shell per person per day and the ash of 83 pounds of wood per family per day. Since the first of these is "reasonable" and the second "moderate" the conclusion is drawn that the assumed age is correct. It seems probable that the shells of 50 shellfish weigh more than 0.56 pound, in which case their assumed equivalence would be disproven. Since the Emeryville mound approximated the Ellis Landing mound in size, a population of the same size was assumed, the unit weights for shell and ash substituted, and its calculated age using shell found as 3,300 years or using ash as 3,700 years. Since the calculated ages of these two mounds chosen at random agreed so closely, the conclusion was drawn that the estimates were corroboratory.

Granting the initial assumptions of population and unit consumption of shell and wood, an obvious objection arises against regarding the estimated ages of these two mounds as in any way corroboratory. It

is an accident that the ratios of shell to ash in these mounds are similar. Turning to the whole series we find this ratio varies as follows:—

Sausalito.....	13 to 1
San Mateo Point.....	10 to 1
Ellis Landing, Greenbrae and San Mateo.....	5 to 1
Emeryville and San Francisco.....	4 to 1
Castro.....	3 to 1
San Rafael, Carquinez and West Berkeley.....	2 to 1

It is obvious that the discrepancies in the ages estimated by the shell and ash methods using these other ratios and assuming the same units of consumption would invalidate the method. Again, with similar ratios of shell to ash, mounds of the same volume must of necessity yield the same estimate of age, but vary the volume and the ages are in no way corroboratory. A general statement that where the lower ratios apply "it does not mean merely that the inhabitants burned more than the usual amount of wood; but it undoubtedly means that the mound was built up more slowly than others with a less amount of ash" does not establish the fact, but if true would invalidate the method used above.

In this area where cultural evidence indicates a long and continuous occupation with but little variation in the individual traits, chronological evidence is at a premium and Mr. Gifford's contribution cannot be underestimated. The treatment of each mound separately by these methods is a desideratum.

LESLIE SPIER

ASIA AND OCEANICA

The Oraons of Chota Nagpur: Their History, Economic Life and Social Organization. SARAT CHANDRA ROY, M.A.; with an Introduction by A. C. HADDON, M.A., Sc.D., F.R.S., M.R.I.A. Ranchi, 1915. Pp. XIX, 491. Illustrations and a map.

The Oraon, who are described in this volume, are one of the more northerly of the Dravidian-speaking peoples of India, now occupying a considerable portion of the Chota Nagpur plateau. They have as neighbors the Santal (a Munda tribe) and several other groups of aboriginal peoples of much interest. Closely allied to the Maler (Male, Malto) of the Rajmahal Hills, they formerly lived far to the southward, Grierson placing them definitely in the Carnatic. From this southern home, their migrations were long and apparently somewhat complex, ultimately leading them to their present habitat, whence they drove out

the earlier Munda-speaking occupants. They have probably mixed to some extent with these, and with Hindus during their long peregrinations.

The general culture of the Oraon is distinctly above that of the lower aboriginal tribes. They are agriculturalists, depending largely on rice and millet, and employing terrace cultivation to some extent, although without any artificial irrigation. In common with many aboriginal peoples of southeastern Asia, they are very fond of rice beer, which is made and consumed in large quantities on festival and ceremonial occasions. Animal foods in general are little eaten, and the totemic animals of each clan are taboo to its members. The Oraon dwellings are rectangular wattle and daub structures, with thatched roofs. The villages are mere orderless groups of dwellings, but a dance ground, a men's house and a girl's house are invariably present. The bow (the arrows not infrequently unfeathered), the spear and slightly curved throwing clubs are their chief weapons. Metal working and pottery making are little practised, but cotton cloths of moderate fineness are rather extensively manufactured.

The Oraon are divided into sixty or more exogamic totem clans, named after animals and plants. No descent from these is claimed, but they are supposed to have aided or protected the clan-ancestor in some way. Descent is apparently in the male line. No phratry grouping of the clans has been observed. Quite strict taboos are in force among the members of a clan in regard to the totem, and not only will an Oraon himself abstain from killing, eating or using his totem, but he will attempt to prevent others doing so in his presence. In the case of totems such as rice, salt, etc., whose use is indispensable, only some special form or manner of eating it is forbidden. There are also interesting cases of the transference of totem taboos to other objects which happen to have in fact or in name, a resemblance to the totem proper. Thus the Tiger clan must abstain not only from the tiger, but from the squirrel, whose stripes suggest the tiger; the Monkey clan extend their taboo to a tree which bears the same name as the monkey, and therefore may neither cut or burn it, nor sit under its shade. No distinctive badges or personal marks symbolic of the totems are in use, although there is a possibility that the wooden figures carried in certain clan festivals, may represent the totems of the village founders.

Every village has, adjoining the dance ground, a men's house, to which all boys go at the age of eleven or twelve. There are three grades of membership, through which all must pass, remaining three years in each of the lower grades, and in the upper until they are married. Cere-

monies for the admission of boys into the lowest rank are held every three years, and involve rituals designed to make the individual a good hunter, and to ensure fertility. An institution on similar lines is in existence for the girls, but its exact location is supposed to be kept secret. One of the duties of the girls is to make mats for the boys in the men's house. For the girls, a fecundity ceremony is held, involving the use of germinating grain, the sprouting plants being later presented to the boys. The girls visit the boys secretly and nearly complete premarital freedom of intercourse is allowed. Each village has its head-man or chief whose authority is very considerable, and who sometimes is one with the village priest. The villages are grouped in "parhas" or larger communities of from seven to twenty or more villages, and for these larger units, there is a fairly efficient form of central organization.

According to tradition, when the Oraon settled in their present habitat, the land was cleared and occupied by groups of brothers or cousins, to which family group the land thus belonged. Ceremonies were held by these groups to propitiate the disturbed spirits, and each sept today thus holds its land and has its own group of spirits, to which, at annual gatherings of the members, offerings are made. Part of the forest-land was set aside for the general spirits, the ritual for whom is in the hands of the village priest. The Oraon have a well-developed ceremonial life, some of the rites relating to agriculture, others to the tribal hunts, etc. It is interesting to note in connection with these latter, that while the men are away on the hunts, the women dress and act as men. Marriages are prohibited in the spring prior to the Sarhul festival, in which the marriage of the Sun and Mother-Earth is symbolized by that of the village priest and his wife. The dead are either cremated or, in case the death occurs during the summer months, buried until after the harvest festival, when the "great marriage of the dead," is held. The bones are then exhumed and burned, the ashes being deposited usually in a stream of running water. The spirits of the dead are supposed to go to an underworld, where they are dependent upon the offerings of food made by their descendants, over whom they are supposed to watch. The origin tradition in its account of Dharmes and the twelve Asurs, in which the latter are induced to cremate themselves alive in the hope of securing great riches, has many interesting analogues in southeastern Asia and Indonesia, and seems to rest upon a very early and widespread foundation.

The volume, of whose store of detailed information the foregoing brief sketch can give but an imperfect idea, is to be followed probably

by another, in which especially the religious life, language, and folklore of the people is to be treated. Probably in this second volume a somewhat clearer idea will be given of the sequence of ceremonials and their relations, a matter rather hard to gather from the accounts given in the present study. It would greatly add to the usefulness of the book, if the index were fuller and more carefully prepared. One looks in vain in the index to this volume for a score of important headings, the larger part of the references given being to relatively unimportant details.

Mr. Roy, who by the way has written a previous volume on the Mundas of this same region, has by his painstaking gathering of material and its publication in such generally admirable form, done a most signal service for Indian ethnology, and has amplified and added to the information given in regard to the Oraon in recent years by Dehon, Grignard and Hahn. Had we as excellent studies of ten or fifteen other Indian tribes, we should feel that we were on the way toward unravelling some of the troublesome problems of the marvelously interesting Indian area. May the author be encouraged to continue his valuable work, and may his example stimulate others of India's sons to do for other tribes, what Mr. Roy has done and plans to do for the Oraon.

R. B. DIXON

The Turano-Ganowa'nian System and the Nations of North-East Asia.

(To commemorate the fortieth anniversary of Morgan's "Systems of Consanguinity and Affinity.") LEO STERNBERG. (International Congress of Americanists; Proceedings of the XVIII Session, London, 1912. Pp. 319-333.)

While Morgan was so deeply impressed with the resemblance of South Indian and North American kinship terminologies as to infer the common origin of the Asiatic and American races, he lacked evidence for the occurrence of a similar system in the immense intervening area. This deficiency Dr. Sternberg now attempts to supply.

The system of the Gilyak of the Amoor region is the most typical representative of the Turanian type, indeed it is more classificatory than most classificatory systems since the terms for husband and wife are not individual but class terms. This terminological feature, according to the author, is simply a reflection of the actual marriage regulations, by which a whole group of men have marital rights over a group of women. Cross-cousin marriage occurs with its terminological consequences, and sociological differences between the Western and the Eastern Gilyak find expression in nomenclature. The *punalua* family occurs as a sub-

ordinate feature, but the orthodox form of group marriage is for members of a certain clan to marry into one certain other clan,—in other words, a group of clan brothers marry a group of clan sisters while Morgan supposed that the members of one of the groups might not have been related. From this Dr. Sternberg concludes “that the so-called *punalua* family, on which Morgan based the Turanian system is not the true original form from which this system has evolved.” I believe this conclusion is correct, but do not see that it is established by correct reasoning. Why could not the heterodox Gilyak form of marriage represent a survival of primitive conditions rather than a breakdown of ancient custom? And, apart from this purely logical consideration, how can a principle of such importance be inferred from a single concrete case?

Among the Tungus the author found a similar classificatory system, which differs, however, in one interesting feature from that of the Gilyak,—a confusion of generations inasmuch as a man’s “elder brothers” include his father’s younger brothers. This terminological feature is accompanied by the exercise of marital rights over the wives of the father’s younger brothers as well as of his own elder brothers.

Among the other northeastern tribes Malayan, or, as we should rather say, Hawaiian traits appear in the nomenclature. Thus, among the Yukagir brothers and sisters, as well as cousins of every line, both on the father’s and the mother’s side, merge into one class. Dr. Sternberg holds that the Hawaiian system is not, as Morgan supposed, a precursor but a later modification of the Turanian form. It is interesting to find independent corroboration from Siberian data for the theory Dr. Rivers has developed on the basis of Oceanian material. There is much to support this view in the way of general grounds, and Dr. Rivers has adduced some positive testimony to show that the direction of the change in Oceania has actually been from the Hawaiian to the Turanian rather than *vice versa*. On the other hand, I do not find any such specific evidence for Siberia in Dr. Sternberg’s presentation of the case. Here again, then, I must regard his conclusion as inadequately grounded, though probably correct.

I refrain advisedly from commenting on certain more special hypotheses and views advanced by Dr. Sternberg, for it seems better to await the fuller treatment of his forthcoming monograph in the reports of the Jesup Expedition. He has doubtless extended our knowledge of the distribution of the classificatory system and of its variations on Asiatic soil. I fear, however, that even a greater similarity than that actually found between American and Asiatic kinship terminologies would fail

to convince me of the common origin of the American and Asiatic *racés*. Kinship nomenclature is a cultural or linguistic phenomenon and may demonstrably be borrowed; hence it has no necessary connection with race.

ROBERT H. LOWIE

Ein Beitrag zur Ethnologie von Bougainville und Buka mit spezieller Berücksichtigung der Nasioi. ERNST FRIZZI. (Baessler-Archiv. Beiheft VI.) Leipzig und Berlin: B. G. Teubner, 1914. Pp. 56, 70 figs.

The Baessler-Archiv has given us many important contributions to ethnology, this paper by Professor Frizzi of Munich being one of the more recent ones. During the years 1911-1912 Professor Frizzi made an extended journey to Asia and the South Seas, and spent the last six months of 1911 in Buka and Bougainville, the most northwestern of the Solomon islands. Here he not only made many anthropological and ethnological observations, but also gathered together a representative ethnographical collection for the Royal Museum in Munich. In the present paper he gives us the results of his ethnological studies, with numerous illustrations, not only of native life and industries, but also of many of the objects in his collection.

The island of Bougainville, the largest in the Solomons, is very imperfectly known. Guppy, Ribbe, Parkinson, and Thurnwald are our chief sources of information, but their accounts are either fragmentary or limited to restricted regions and topics. Frizzi divides the natives of Bougainville into six linguistic groups. Within some of these groups there are strong dialectic differences between the coastal and interior tribes. A sketch map illustrates roughly the location of these groups. Most of Frizzi's material is from the Nasioi, who occupy the east central part of the island.

After the general introduction there are several myths giving the origin of the coconut palm, the kanari nut, the "sing-sing," and the dog. The chief deity is Kumponi, who made the earth and all the other gods. He also created man out of the earth, and gave him all the animals, vegetables, and fruits which were to serve as food, all of which he took out of a cooking-pot. Man has two souls, one of which goes to the underworld, while the other remains on earth in the little spirit hut erected for it. Mourning and burial customs are described, also marriage customs and inheritance, totems, and secret societies. The material culture is treated rather fully, with figures of most of the objects.

In an appendix Erich M. v. Hornbostel gives the text and musical notation of several songs transcribed from phonographic records obtained by Frizzi, and discusses briefly their character and relationships.

From the nature of the case Frizzi's contribution is necessarily sketchy and incomplete, but the numerous observations and illustrations that he gives form a welcome addition to our knowledge of this little-known region.

A. B. LEWIS

SOME NEW PUBLICATIONS

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Whiffen, Thomas. The North-West Amazons; Notes of some Months spent among Cannibal Tribes. New York: Duffield and Co., 1915. Pp. xvii, 314, 3 maps, 2 sketch maps. Frontispiece and 54 plates.

DISCUSSION AND CORRESPONDENCE

USE INHERITANCE AND CIVILIZATION.

DR. KROEBER's recent "Inheritance by Magic"¹ calls for a word of comment. The article is an eminently clever one (in the non-Anglo-Saxon sense of the term) and represents, to my mind, a rather striking *prima facie* argument in defence of historic determinism of which Dr. Kroeber has proved to be an eloquent advocate. It seems scarcely necessary to voice one's hearty approval of Dr. Kroeber's forcible denunciation of the all too frequent confounding of organic with super-organic life on the part of the uninitiated and some of the initiated as well. Possibly Dr. Kroeber under-estimates the number of those who would agree with him.

Dr. Kroeber's principal thesis, however, I take to be his assertion that the belief in the inheritance of acquired characters is a function of the confusion between biology and history. He says: "It would then appear that belief in acquired heredity is merely a result of the failure to distinguish between social and organic processes" (*American Anthropologist*, vol. 18, p. 38). With this proposition I cannot agree, nor do I therefore countenance the author's optimistic prediction that "when this point is once grasped, and the distinction between the forces of life and the forces of civilization is courageously adhered to, the eyes see a new world. There is no longer any problem of acquired heredity *nor any possibility of a problem.*"¹ As against this startling proposition I want to submit that the problem of the inheritance of acquired characters is fundamentally a problem of biology pure and simple. For one so little competent in biology as myself it would be futile to express an opinion on the merits of the question, either *pro* or *con*; I should insist, therefore, that my concern is not with the problem of use inheritance but with its logical status.

Dr. Kroeber himself puts the matter in a nutshell when he writes: "There is no doubt that if use inheritance existed, we should have a much simpler, more natural, and more convincing explanation of evolution, in many cases, than human ingenuity has as yet been able to give

¹ Pages 19-40, above.

² The italics are mine.

with the principle of natural selection" (*ibid.*, p. 29). And again: "If Mendelism rests on anything at all, it rests on the doctrine of the utter separateness of what it calls gamete and zygote. This separateness may be purely conceptual, but it is the only concept which it has yet been possible for anyone to think out that will explain and hold together the looming mass of facts heaped up by genetic observation and experiment" (*ibid.*, p. 27). Quite true! It is a case of one concept against another, nor has anyone as yet succeeded in bringing about the crystallization of either in a form less intangible. Those who would insist on the causal nexus between the case Civilization vs. Biology and use inheritance, should keep in mind that the problem of the inheritance of acquired characters concerns not men alone, but hogs as well. And, after all, when divested of the obviously absurd association with clearly cultural traits, use inheritance is not *per se* an irrational conception. Herbert Spencer's theory of the "circulation of protoplasm," for instance, may be wrong, but it is not inherently absurd. Again when Mr. Crawford in a recent publication¹ dealing with certain finely spun Peruvian fabrics says that "the transition from the cone of carded fibre to the completed yarn was a continuous process, or series of finely graded movements," and seeks explanation for this highly specialized accomplishment in "marvelous sensitiveness and dexterity of fingers acquired through centuries of application of inherited skill," one shrinks from accepting the hypothesis; but in doing so he would do well to remember that while we are profoundly ignorant of any mechanism by means of which such a result could be brought about, nothing stands in the way of its representing an adumbration of some fundamental physiological truth but that conceptual separation of the germ cell from the rest of the organism which seems to coordinate so nicely some recent facts of experimental genetics. As to mechanism, no one denies the basic fact of heredity responsible for the continuity of species and physical types, but how much do we know of the mechanism of heredity? A few facts of the well-known behavior of macro-organisms; a few more facts of the less well-known behavior of micro-organisms; and the limit of our knowledge is reached.

To repeat then, Dr. Kroeber deserves credit for having once more emphasized the deep-rooted disparity between the biological and the historical approach, between physical heredity and the cumulative processes of civilization; but he errs, in my opinion, in believing that

¹ *The Cotton of Ancient Peru* published by the National Association of Cotton Manufacturers, 1916, pp. 8-9.

he has also solved the problem of use inheritance by proving its non-existence, nay, even the impossibility of its existence. Use inheritance neither stands nor falls with its application or non-application to civilization. Its roots rest in biology alone, and on biological evidence alone will depend its ultimate bloom or up-rooting.

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HEREDITY WITHOUT MAGIC

I am in thorough accord with Dr. Goldenweiser's proposition that the problem of acquired heredity is ultimately a purely biological one to be solved by biological evidence alone. Every and any problem of heredity can of course be legitimately grappled with only by biological methods. My essay,¹ in spite of some prognostications, refers to the present, not the future; and deals with the respectively serviceable and unprofitable understanding of facts that confront our vision today, not with the timeless truth of logical concepts. Personally, I cannot rid myself of the conviction, which I have recently expressed, that "it is possible that when the missing factor or element of evolution is discovered which neither Darwin nor the mutationists have been able to find, this factor will prove to be something superficially similar to use inheritance." But if there is any truth whatsoever in the basic contention that the existing explanations of organic or social phenomena by acquired heredity are vitiated by a confounding of organic and social factors, it seems incontestable that the new explanation which the future may hold in store for us will involve a process that in its essential machinery will be fundamentally different from the present explanation, or in a sense even diametrically opposed to it. When this new explanation shall be formulated, the surviving adherents of the dogma of acquired heredity will no doubt consider themselves vindicated; whereas actually, I have faith, that dogma will have been relegated one step farther into the obscurity of the discarded.

It has been plain for many years that acquired heredity conflicted with the overwhelming mass of biological facts. Its only claim to a hold lay in the circumstance that there were certain facts which other processes also failed to explain. My essay maintains the proposition that this circumstance constitutes no valid claim even for tentative adherence to the doctrine, because its fundamental bias, which springs

¹ On page 39, line 16, for *racial* read *social*.

from a confusion, is obvious. Other processes of organic evolution may be insufficient; but at least their motive and origin and modus are biological, that is, organically founded, and they are therefore beyond the sphere of the historian to assail. The use inheritance explanation, however, being rooted, as a phenomenon in the history of science, in social concepts, is assailable in its psychological basis. I should not hesitate to declare it an erroneous doctrine if it were supported by a million cases of apparently water-tight evidence. The assumed future explanation, however it may resemble the one of acquired heredity outwardly, must differ from it utterly in being a truly organic and not a pseudo-organic one.

The crux of the whole matter lies in the question whether or not there is anything superorganic. Some biologists deny this possibility outright. Most others will make the admission formally, but refuse—not to employ the concept of the social, which indeed would be fatal to their work—but to leave any room for it; extending organic explanations to all phenomena that rest on the existence of organisms. The inclination of that chaos which we call civilized public opinion, is the same. The very denial, or refusal to recognize the superorganic practically, reacts unfavorably on biological science: the social having been treated as organic, the delimitation of the two planes is effaced, and purely organic phenomena are always open to explanation by social processes, as in this very matter of acquired heredity. With all this, it may be said, the historian has no concern. This is so, in a sense; biological truth and falsity must be settled by biologists. But so far as the sentiment of the educated but non-professional world is concerned, historians are at equal liberty with biologists to present their claims and to win its support so far as they can. And as to their own science or sciences, they certainly have every justification, every need even, of putting their house in order, and preventing its invasion by alien elements. If biologists will join them in a coöperative effort to establish the exact nature and the precise limits of the organic and the superorganic, so much the better. As long as efforts in this direction are not seriously reciprocated from the biological side, students of social phenomena must undertake the task alone, as best they may; and their incursions into biological fields in the pursuit of this goal are not open to condemnation. Such an incursion is what any analysis of the attitude of mind underlying the current belief in acquired heredity necessarily is, for students of history: it is quite incidental and subordinate to a recognition of the existence, and an understanding of the scope and nature, of the superorganic or social.

I do not pretend to estimate the number of the "initiated" into this recognition. I do know that there are those who are uninitiated and half initiated—among the public, in biology, and in our own ranks of historians and anthropologists; which fact is a reproach and a cloud on the so-called enlightenment of our day. If there is nothing beyond the organic, let us quit our false and vain business and turn biologists, and encourage the world to reason and interpret only in organic terms. But if there is a superorganic phase, it behooves us not merely to rest supine within our knowledge, but to press this great truth at every opening and every turn, to brand each error and confusion as fast as it raises its head, to stigmatize all half-hearted evasion, to meet argument with argument and, if necessary, assumption and assertion with counter assumption and assertion, to fight candor with candor so far as may be in us, reasoning with reason, presumption with a challenge; to stir stupidity unceasingly, harrass cowardice without mercy, and encounter prejudice with every weapon and on every condition of its own choosing; until the time shall come when there will no longer be question of the proportion of the initiated, but a true democracy of the intellect shall prevail in which there are no more uninitiated or outcast, in these matters at least; when we shall be able to push on to the next of the problems that lie before us in infinite series.

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REMARKS ON THE AZTEC CALENDAR SYSTEM

Dr. Waterman, in his recent paper, "The Delineation of the Day-Signs in the Aztec Manuscripts,"¹ has presented a comprehensible and concise interpretation and exposition of the workings of the calendar system of the Aztec. It is by no means my intent to review or to criticize this presentation, but rather to amend it by voicing some ideas which presented themselves during its perusal.

The Aztec *cempoalli*, as Dr. Waterman remarks (p. 302), has been generally interpreted as a month, though having absolutely no relation, as has the modern month, to the phases of the moon. It is easy to see how this interpretation has arisen, the *cempoalli* consisting of twenty days and thus approaching, more closely than any other Aztec temporal division, the length of the lunar month. If, however, we analyze the Aztec calendric elements from the point of view of their progressions,

¹ *University of California Publications in American Archaeology and Ethnology*, xi, 6.

rather than of their respective lengths, a different interpretation immediately presents itself. Dr. Waterman, though explaining that the *tempoalli* should not be interpreted as a month, yet commits the error of analogizing it with the Roman month in his later discussions (p. 309). Thus he states that the Aztec dated their days in sequence in a manner which would correspond to our progression *January one, February two, March three*, etc., concluding that this system is "utterly different from what we happen to do ourselves" and "the last thing probably to suggest itself if one of us were inventing a calendar system." Such an interpretation is calculated rather to make the average student despair of ever comprehending the vagaries of the Aztec calendar. As a matter of fact, if properly interpreted, the system is strikingly like the European.

In both the Gregorian and the Aztec calendars two main categories of time are, or were recognized; one composed of a definite number of *named days*, the other of a definite sequence of *numbered dates*, *i. e.*, the *week* and the *month* respectively. The *tempoalli* is consequently the Aztec week, not the month. This interpretation was recognized by Seler in "The Tonalamatl of the Aubin Collection" (p. 6), though not on the above grounds. The fact that the "week" thus consisted of twenty days and was the more important factor in dating, while the "month" consisted of only thirteen days and was entirely disregarded, need not disturb us. The Aztec thus dated his days in sequence *Monday* first, *Tuesday* second, *Wednesday* third, just as we. When he reached Cane, the thirteenth, he began the dates over again with Ocelot the first, just as naturally as we follow Wednesday the thirty-first with Thursday the first. Neither did he feel constrained to commence his dates over again anew after he had run through his twenty days, any more than we feel compelled to follow Saturday the seventh with Sunday the first. In both systems there are two continuous and simultaneous, though independent, progressions.

The crux of the difference between the Aztec and the Gregorian calendars is that the Aztec used only the day and the date, as Water the eleventh, while we interpolate also the name of the month, as Friday, *March* the eleventh. Moreover, we disregard the name of the day for purposes of dating. But let us suppose that we did not use the names of the months for purposes of dating but used the day names instead; the two systems would then be perfectly analogous. Thus the Aztec used twenty days and thirteen dates in all possible combinations, a total of 20 times 13 or 260 indices, while we use seven days and thirty (more or less) dates, a total of 7 times 30 or 210 indices. Thus in the solar year,

a duplication of 105 indices occurred in the Aztec calendar, while in ours a duplication of 155 indices would occur if all our months were of regular length. Thus in this year (1916) many of the indices will occur only once. Sunday the first can occur only in October, Tuesday the sixteenth only in May, Thursday the twenty-ninth only in June. But Monday the fourth may be a given day in either September or December, Wednesday the fifteenth in March or November, Saturday the nineteenth in February or August. Due to the irregularity in the lengths of our months, some indices occur three times in our calendar year, as in the months of January, April, and July of this year. This would not be so if, as in the Aztec calendar, all months had the same length. It will be readily seen that such a system has great disadvantages in a modern civilization, but was a perfectly satisfactory scheme in a society where the principal purpose of the calendar was to distinguish lucky from unlucky days, such as the determination of our unluckiest of all days, Friday the thirteenth, which will fall in October this year.

Had the tendency to consider the Aztec system as an academic philosophical problem rather than a practical working system for the distinction of dates been properly avoided, such naive explanations for the limitation of the Aztec month to thirteen days as those which Dr. Waterman has compiled and criticized might not have been perpetrated. Dr. Waterman falls into the same error in stating (p. 323) that, since there were twenty day symbols, determined by the vigesimal numeral system of the Aztec, "we should certainly expect it to lead to the selection of twenty calendar numerals." A moment's thought will show one that, had 20, or any factor of 20, that is, 1, 2, 4, 5, or 10 been used for the number of days in the smaller temporal division, every *cempoalli* would begin with the numeral 1 and no distinction could have been made between them without further appending the name of the *cempoalli* as a whole.

It was obviously a desideratum, if not an absolute essential, that such a number be used in combination with the twenty day-signs that the entire number of possible combinations of day-sign and number (index) be exhausted within the solar year with as little duplication as possible. It has been shown that no factor of 20 would accomplish this result. Similarly, if the number 8 were used, every other of the eighteen *cempoallis* in the solar year would be alike; if 3, 6, 12, or 15, every third; if 16, every fourth. If 7 or 14 were used, every seventh *cempoalli* would be alike, every index occurring at least twice in the solar year, the majority three times. If 9 or 18 were used, every possible index would occur

twice yearly. There remain as possible integers 11, 13, 17, and 19, each of them exhausting a large number of indices and leaving as a residue a varying number of indices which must be repeated in any given solar year.

Here the calendrists were brought face to face with a dilemma. They must choose between a numeral such as 11, which left a large number (145) of duplicate indices in the year, and a numeral such as 17 which, though permitting but few duplicate indices during the year (25), yet, because of its high numerical value, must have involved considerable difficulty in writing and reading. For it must be borne in mind that no system of numerical orthography had been evolved for the writing of dates, and that to write the number 17 required drawing laboriously seventeen circles. Is it too much to suggest that the number 13 was adopted as a mean between the equivocal 11 and the laborious 17?

Again, let us suppose that Aztec custom required or preferred that the year begin and end with the same date, as it actually did. The only one of the three numbers is 13, indeed the only one of the higher numbers besides 7 and 14 which will secure this end. This may well have been a causative factor rather than a secondary result, as already suggested by Dr. Waterman (p. 313). It is interesting to note that our calendar attains the same result by the use of one of the above-named alternate integers, namely 7, so that our year normally begins and ends on the same day of the week.

This seems to me to be a more rational explanation for the existence of the element thirteen in the Aztec *tonalamatl*, not that it is derived from intricate astronomical observations, nor from religious custom, nor yet from the addition of ears and noses, but merely that it is the number which most satisfactorily fulfills the requirements for the practical purpose to which it was put, the distinction of dates. Nor is it necessary to assume that some Aztec Gregory figured it out as we have done; in the course of time, through natural observation and correction, the exact combination most satisfactory to the case must eventually have been evolved.

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DR. SPECK'S "THE FAMILY HUNTING BAND"¹

I SHOULD like to discuss a few points raised by Dr. F. G. Speck's paper in a recent number of the *Anthropologist*, called "The Family Hunting Band as the Basis of Algonkin Social Organization." In dealing with

¹ The *American Anthropologist*, Vol. 17, pp. 289-305.

tribes who have been as long subject to European contact as the Micmac, Malecite, and Penobscot we must always face the fact that the information which we obtain is at its best very uncertain; therefore it is not surprising that Dr. Speck did not find out what often takes more of the qualifications of a detective than of a trained ethnologist. What is surprising is that one of Dr. Speck's experience should state so categorically that the Micmac had a social system which was radically different from the Penobscot social system. Now I do not approve of such a loose use of the term totemism which will include the Penobscot system; still if we care to apply that name to the Penobscot system we must apply it to the Micmac as well. What seems to lead Dr. Speck to call the Penobscot system totemism, is the fact that the Penobscot were divided into bands which as a rule had animal names. Now this is precisely what the Micmac had, notwithstanding the fact that Dr. Speck states categorically that they did not, although he makes no attempt to justify his utter disregard and flat denial of published statements to the contrary. Professor Ganong, who knows New Brunswick probably as well as anyone living, writes that the Micmac at Restigouche composed the band that bore the name of Salmon and that the present Micmac there are well aware of the fact. An informant of his at the Miramichi whose name he gives, said that the Miramichi country was divided into three bands; those of the Main Southwest Miramichi were the sturgeon band, those of Little Southwest Miramichi were the beaver band, while those of the Northwest had an emblem of a man with a drawn bow.

When one undertakes the study of a people who have to a large extent lost their culture, it is always advisable to consult writers who had an opportunity to observe them before they had been very long under European contact. This Dr. Speck has failed to do, for had he consulted the writer who is best known on the Micmac, he could not possibly have overlooked the fact that the Micmac must have had an organization similar to that which Dr. Speck ascribes to the Penobscot. The author I refer to is Le Clercq who wrote the *Nouvelle Relation de la Gaspésie* and who lived among the Micmac for twelve years during the latter part of the seventeenth century. Le Clercq states that the Indians at Restigouche wore a salmon, those of the Miramichi belonged to a band which had an emblem very similar to a cross, and that all the other bands of Micmac had their particular emblem. The subject is not worth going into further here as I am giving it a full discussion in a memoir which I am at present writing for the Geological Survey of Canada. Besides it has already been fully described by my friend, Professor Ganong, in the

introduction to his most valuable work published as the fifth volume of the publications of that well-known organization "The Champlain Society."

A few more points of Dr. Speck's paper seem to require discussion before I conclude, for they are not self-apparent and may, like the statement of Dr. Speck's already considered, merely express his own opinion. Dr. Speck states that the Micmac came to Newfoundland about two hundred and fifty years ago "by estimate," and from the context we naturally assume that this estimate is based on the size of the hunting territory of the various bands, those of Newfoundland having larger territories than the other Micmac. It is not at all self-evident how he can deduce this. Nor is it entirely probable that the Micmac came there two hundred and fifty years ago; certainly we have every reason to believe that the present Micmac territories in Newfoundland are of a much later date, for Chappel, who questioned the Micmac in the early eighteenth century, found that they stated that they only occupied those territories after the war for American Independence. Dr. Speck should at least explain his method better, for to us it is not clear how he can argue that the Micmac came to Newfoundland two hundred and fifty years ago because their hunting territories are larger than the mainland Micmac, whereas the Penobscot came, according to his statements, from 'territories' which are larger to those which are smaller, though in this case he does not give the date. He seems to make his facts fit his fancy or else he has a very comfortable method indeed which allows him to use his facts in either way he wishes.

Finally, it may be added that Dr. Speck presents in his paper nothing which has not been well known for a long time to the anthropological world (though in places he adds details which do not always agree with previous statements). Morgan, for example, states that the Abnaki had gentes with descent in the male line, which is what Dr. Speck states, although he does not make it clear what he means by descent in the male line for he states that marriage was largely arbitrary and that exogamy did not prevail. Now if he would stop to consider, descent would be both in the male and the female line in that case, for both the parents would belong to the same band—sturgeon for example—and all the children, both male and female, would belong to the sturgeon band.

Lastly, he does not at all prove, as he states he does, that the organization which he describes was the fundamental one for the Algonkin tribes, and that the more elaborate one which we find among some Algonkin tribes was merely due to contact with other people. The facts might

very well be interpreted to mean that the Eastern Algonkin system is a broken-down system which once had exogamous clans. In fact I think most people will agree that that is the more probable explanation; at least it agrees with Morgan's statement which after all cannot be disregarded, especially when it is in line with the facts.

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NOTE ON LOEWENTHAL'S "DER HEILBRINGER IN DER IROKESISCHEN
UND DER ALGONKINISCHEN RELIGION."¹

In the first part of *Zeitschrift für Ethnologie* for 1913, pp. 65-82, Dr. John Loewenthal has an extensive article with the above title. The undersigned feel that Herr Loewenthal should be highly commended for his diligence as shown by his very great command of the literature on the subject. At the same time the Iroquoian and Algonquian etymologies given are practically all wrong. The fundamental error has been that the writer has seized on this and that morphological element to bolster his case without due consideration whether such elements can occur in the positions desired, or whether synthesis of such elements holds good universally. In point of fact, though both Iroquoian and Algonquian may be analytically reduced to the constituent grammatical elements, yet synthesis of such elements is restricted, not free.

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¹ Printed with permission of the Secretary of the Smithsonian Institution.

ANTHROPOLOGICAL NOTES

Anthropology at the University of Arizona. The progress of anthropological instruction in colleges is always interesting since it illustrates, in part at least, the extent to which the results of research in the science are accepted by the thinking men and women of the country. Arizona University is the most recent of our American institutions to add a course in anthropology to its curriculum and to undertake the serious presentation of facts relating to the development of human culture. The head of the newly organized department is Professor Byron Cummings, who, previous to his resignation as Dean of the School of Arts and Sciences at the University of Utah, conducted numerous expeditions and instructed large classes in archeology at the Utah college.

The fame of Arizona as a field for archeological research has long been recognized but no local effort was made to guide and increase public knowledge of archeology until Professor Cummings accepted the chair of Anthropology in September, 1915. His first year's instruction divided itself into two parts, embodying, respectively, general courses in European and American archeology. During the first semester, a class of seven students began its work with a brief glance at the geography of prehistoric Europe and the known evidence of the distribution of eolithic, paleolithic, and neolithic culture. Special attention was given to ancient man and his problems in England, France, Germany, and Italy. In like manner, the students gained a workable knowledge of early Egyptian, Assyrian, Cretan, and Grecian culture, the latter being traced to the Persian invasion.

For the second half year Professor Cummings is centering attention upon the American field. That this phase of the subject is more interesting to western students and that the first part of the course gained considerable popularity, is evident from the fact that the class now numbers twenty. The geological history of the continent was briefly treated, before the American red race, with the several theories of its origin, received consideration. Instruction also covers the ethnology of the American tribes, especial emphasis being laid upon those of the great plateau region of Arizona, New Mexico, Utah, and Colorado. Professor Cummings intends that the first year's course in general European and American archeology will serve merely as a foundation for

more advanced instruction, and hopes, at the same time, that it will be recognized as a proper basis for the study of history and sociology.

The University Museum was opened the second week in January and has already attracted much attention from the citizens of Tucson, and Arizona generally. Responding to a popular demand, Professor Cummings has undertaken to deliver a series of ten Monday evening lectures, and these are being largely attended by students, faculty, and townspeople. The program is meritorious and well deserves the support which recent information indicates it is receiving. The printed invitations bear the following subjects:—

1. Geology of the Glacial Age and Man in the Glacial Age.
February seventh.
2. Periods of Human Culture: The Stone Age.
February fourteenth.
3. Mound Builders of the Mississippi Valley.
February twenty-first.
4. People of the Great Plateau: Nomadic and Sedentary Tribes.
February twenty-eighth.
5. Prehistoric Arizona: The Cave Dwellers.
March sixth.
6. Prehistoric Arizona: The Cliff Dwellers—Their Agriculture and Architecture.
March thirteenth.
7. Prehistoric Arizona: The Cliff Dwellers—Their Textiles.
March twentieth.
8. Prehistoric Arizona: The Cliff Dwellers—Their Pottery.
March twenty-seventh.
9. Prehistoric Arizona: The Cliff Dwellers—Their Political and Religious Organizations.
April third.
10. Modern Arizona: The Hopi and Pima Tribes.
April tenth.

THE DEPARTMENT OF ANTHROPOLOGY of the American Museum of Natural History will carry on the field-work for the season under two main heads: continuation of Southwestern exploration under the Huntington grant; and continuation of general research in other parts of North America under the Jesup fund.

In the Southwest, Mr. N. C. Nelson will extend his archeological excavations of the Galisteo Pueblo group to the southward, and assisted by Mr. Earl H. Morris of the University of Colorado will excavate the so-called Aztec ruin in the San Juan drainage. The excavations of the Aztec ruin are financed by Mr. J. P. Morgan.

Prof. A. L. Kroeber of the University of California will return to

Zuñi for further investigation of their social and ceremonial organization, and will be accompanied by Mr. Leslie Spier who will make stratigraphic studies of some of the ruins in the vicinity of Zuñi.

Jointly with the University of Colorado Mr. Earl H. Morris continues the exploration of cliff ruins in the San Juan drainage.

Dr. P. E. Goddard will probably make a trip to the White Mountain Apache of Arizona some time during the year to continue his studies in ethnology.

Dr. Robert H. Lowie will spend a few weeks among the Hopi investigating their clan system; the remainder of the season he will spend in Nevada and the Plains, particularly among the little-known Shoshonean tribes.

Mr. Gilbert L. Wilson will visit the Hidatsa and Mandan to complete his investigations of material culture.

Some further archeological work will be prosecuted in the Delaware Valley by Mr. Leslie Spier where Dr. Chester A. Reeds will carry on a supplementary geological survey.

Dr. Herbert J. Spinden has been given charge of the archeological survey of Porto Rico undertaken by the New York Academy of Sciences, and is now in the field. In the early part of the season he visited Venezuela for a preliminary archeological reconnaissance.

SVEN MAGNUS GRONBERGER, of the library staff of the Smithsonian Institution, and an Associate Member of the Anthropological Society of Washington, died in Washington on April 24, 1916. Dr. Gronberger was born at Norrköping, Sweden, August 19, 1866. He graduated from the gymnasium of his native place in 1884, spent some time in France and England, moved to New York in 1886, and in 1907 entered the service of the Smithsonian Institution. At the time of his death he had nearly completed a course for the degree of Doctor of Philosophy at George Washington University. His chief works are biological, but a paper on "The Origin of the Goths," dealing with the Gothic migrations from Scandza, or Scandinavia, into central and southern Europe, will probably be brought out in Sweden.

AN historical pageant is to be given in Yankton, South Dakota, next June, depicting the earlier episodes of the Yankton tribe. The musical themes to be used in the Indian dances and ceremonies will be selected from Miss Frances Densmore's memoir on Sioux music.

Miss Densmore contemplates visiting Fort Berthold, North Dakota, for the purpose of concluding her investigation of the music of the Mandan and Hidatsa tribes for the Bureau of American Ethnology.

THE SMITHSONIAN INSTITUTION has acquired a collection of 490 objects illustrating the arts and industries of the aborigines of British Guiana, gathered by Dr. Walter E. Roth, of Marlborough, Pomeroon River, British Guiana. They will be exhibited after they have been photographed. Another collection from this same country, made by John Ogilvie, is now en route from San Francisco, where it was used in the Museum exposition exhibits.

MR. CARL WHITING BISHOP, of the University of Pennsylvania Museum, has returned to Pekin after three months of exploration in Szechuen province. Mr. Bishop was at Chengtu, the capital of Szechuen province, and traveled some distance northwest from that point to examine old ruins and make archeological studies.—*Science*.

A smoke-dried trophy-head of a Brazilian Indian from the Tapajos River in Para, has just been presented to the U. S. National Museum by Dr. C. Hart Merriam. It is one of the few specimens of these gruesome human trophies in this country, and is on exhibition in the division of ethnology.

MR. FRANCIS LAFLESCHE, of the Bureau of American Ethnology, has gone to Oklahoma to pursue ethnological researches among the Osage Indians. He will also visit St. Louis and St. Joseph, Missouri, to examine the Osage Indian collections in these cities.

DR. GIUSEPPE SERGI, professor of anthropology in the University of Rome, has completed his seventy-fifth year. In honor of the occasion the Roman Anthropological Society has decided to publish a volume of memoirs.—*Science*.

MR. JAMES MOONEY of the Bureau of American Ethnology is about to leave for North Carolina, and possibly Georgia and Tennessee, to continue his researches among the Cherokee Indians.

DR. LEO J. FRACHTENBERG, who has been in the field for the Bureau of American Ethnology for the past year, has changed his headquarters from Chemawa to Portland, Oregon.

J. N. B. HEWITT, of the Bureau of American Ethnology, has gone to Ontario, Canada, and New York State to continue his ethnologic researches among the Iroquois tribes.

FREDERICK STARR, of the University of Chicago, has returned from a six months' expedition to Japan and Korea.—*Science*.

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THE COMMON SENSE OF MYTH

By A. M. HOCART

THE mythopeic man is not yet dead. He is still commonly resuscitated as a mode of explanation. It is necessary therefore to examine his claims to continued recognition. If he has none, the sooner we do away with him the better.

In the first place what evidence is there for his existence? Has he ever been seen, or are there any documents proving his existence in the past? True, in history, as in science, it is necessary sometimes to go beyond one's evidence. Hypotheses are a necessity; without them no progress would be possible; but they should be used with caution and not without good reason. They are the bank notes of science; mere temporary substitutes for the real thing, issued only for convenience, and not to be multiplied beyond need, or they lose all value. We will not quarrel with any man for postulating a mythopeic man with a mind differently constituted from ours, if, firstly, he remembers throughout that it is a hypothesis to be proved; if, secondly, he can show that some such hypothesis is required; if, thirdly, it helps us to understand the facts.

The first condition is not fulfilled: mythopeic man was no sooner imagined than he was promoted to the position of a dogma without ever passing a period of probation as a hypothesis. We are not told what kind of being we should require in order to explain certain phenomena; we are informed that such a man did exist (exactly when or where is not specified), and mythologists proceed

not to deduce by argument, but to state as facts all his little habits and tricks of thought as if they had met him in flesh and blood. They lay down that he was addicted to composing poetry about the sun, moon, and the dawn; that he had a curious twist for hiding the most commonplace truth under piles of metaphors; that to him the sky meant "not an airy, infinite, radiant vault, but a person, and most likely, a savage person;" and so on and so forth. So completely is the hypothetical nature of all this lost sight of that the mythologist never stops for proof; to him it is all fact.

Is the second condition fulfilled? Is it a necessary hypothesis? It might be if we had first tried what we could do with plain, normal, everyday man, as you and I know him, and had failed to reconcile the peculiarities of myth with his known idiosyncrasies; if there was an element in myths that simply could not by any manner of means be deduced from the psychology of *Homo sapiens*, but absolutely compelled us to postulate a mind different in its workings, to be called the mythopeic mind. But as a matter of fact we have never given Brown, Jones, and Smith a chance of showing what they could do. Mythopeic man is called in at every turn. Who believed the Pleiades were seven maidens? Mythopeic man. Who traced the wanderings of Herakles? Mythopeic man. And never a question whether Brown, Jones, or Smith might not have produced exactly the same result. Yet they have given and are still giving us plenty of proofs of their ability to do so, if only we would look down from the clouds upon them. There is the Carolingian cycle: we know the real Charlemagne and his peers on whom these myths were based; we have the successive developments of the myths; we have much information about the Franks who composed those myths, and we have no reason to believe that they differed much from their commonplace descendants. Later there is the legend of St. Francis of Assisi, to mention one in a hundred; nothing we hear about his followers justifies us in assigning to them a mind different from that of the modern Italian. Yesterday's historians believed in events which to-day's reject as myths. If then Everyman can create myths we have no reason

to postulate a special mythopeic man to account for ancient and savage myths.

In the third place does the hypothesis of a mythopeic man explain anything? To explain anything we must have definite laws. You cannot explain the physical phenomena unless you have absolute uniformity of nature. Neither can you explain psychological phenomena unless mind is subject to unvarying laws. To deduce the peculiarities of myths from the minds of their makers, or to deduce the mind of the myth-maker from the myth we must agree that his mind worked according to definite laws. And then we are no better off than we were before, because mythopeic man was invented precisely to account for the apparent absurdities and vagaries of myths. He was only invented because it seemed impossible that such seemingly strange productions should emanate from a logical brain; so they are all put down to the erratic workings of a mythopeic mind dominated by an incalculable element called fancy. That is to give up all explanation; it is to strike at the root of all science by admitting that there is such a thing as chance or caprice. We gain nothing by introducing mythopeic man into anthropology, since he merely represents an attempt to evade explanation by falling back upon the absence of laws. If mythopeic man is to explain anything he must be subject to definite laws which have to be worked out by as patient research and as exact methods as if we were working at the mind of workaday human beings. It is simpler therefore to assume that myths are the creation of commonplace men, to work upon this assumption, and only to give it up when we have found it will not work.

We cannot hope for success unless we are prepared to do more than mere guesswork. We must brace ourselves for as patient research as we are wont to require in Egyptology, Assyriology, or any such discipline. But patient research alone will not do it if the point of view is too narrow. So long as an anthropologist imagines that he can confine his interest entirely to myth, or religion, so long will he be confined to absolute sterility. Our classifications into technology, social organization, religion, magic and so forth are purely artificial; they may suit more or less the

civilization of European townsfolk, though even they do not keep them strictly apart; but these distinctions are quite illegitimate when applied to other races who group their elements of culture in a quite different manner and from an utterly different point of view. So long therefore as an anthropologist confines himself to one of these departments his material will be a useless congeries of facts because the key to nine-tenths lies outside his own province. One half of a custom will lie within religion, the other within social organization; a myth will have some of its roots in technology, others in religion, others in something which we do not know how to classify. If we cast our net wide enough to embrace the whole culture the clues required to explain a myth will find it hard to escape us. Of this I will give an example without further ado.

A very common type of myth in Fiji explains the name or features of an island or piece of land by the fact that the divine ancestor or god brought it from some other place. I will give one specimen from Fiji.

The island of Kambara is little more than a rocky plateau; it is mostly barren, save for one small area of good soil where all the planting is done. The island abounds in a tree called *vesi* (*Azfaelia bijuga*) which is highly prized in Fiji as timber. These peculiarities are accounted for by the following myth:—

There was a spirit called Mberewalaki, the god¹ of Kambara. He went to Oloi, a village of Viti Levu, to beg for soil to bring to his own island. He got soil and besides a *vesi* tree which he intended to use as digging stick when he began to plant in the soil he was taking home. He brought these home, and returned to Oloi for a second lot. As he was approaching Kambara on his way back he found that the people were baking the soil he had brought home on his first journey. He was standing on the reef when he saw the smoke go up. He flew into a passion and hurled the soil at Kambara so that it fell any how, all in a heap, instead of being laid out properly.

The mythologist as a rule dismisses such a myth with the remark that it is etiological. If he means by that that it is used to explain why Kambara has little good soil but plenty of *vesi*, the myth is etiological; but that does not explain the origin of the myth. If by etiological he means that it was invented to explain these facts,

¹ Vu: ancestor spirit or divine ancestor.

we demur. It does not follow because a theory explains certain facts that it was invented to explain them; it is quite possible that the theory already existed and was merely applied to new facts, or to facts that had not attracted attention before. This is an everyday occurrence in science; new phenomena are brought into relation with old theories, and if the theories do not fit they are slightly modified. We have no reason to think that other races in the world proceed otherwise, direct observation is all against it. Until it has been proved that their ways of thought are entirely different from ours, we must assume they are not and work on that assumption till we find it unworkable. What should *we* do if we had to account for the geology of Kambara? Should we simply sit down and let our fancy play about the subject, and dream out some theory? If we were to do that there would be no end to the theories we might think of: we might imagine that the soil had been let down from heaven, as the Rotumans believe of a certain rock in their island; it might be the decayed body of some monstrous animal; or a great tidal wave might have washed the soil off the island except at one spot; or that soil might be a certain kind of rock decomposed; etc., etc. We should have an indefinite number of explanations, and no means of deciding which is the right one: there would be nothing to determine us one way or the other. That is not the way we do: we assume existing geological theories to be true, and approach the island of Kambara from the point of view of these theories. Straightway all these endless creations of fancy are struck off the list as quite impossible, and we are left with a few alternatives, which a careful examination ultimately reduces to one. In explaining things we are simply driven to certain conclusions by our preconceptions and the facts they work upon. Why should it be otherwise with Fijians? If they think like us what will they do when they begin to take an interest in the physical peculiarities of their island? They will approach the problem from the point of view of their own preconceptions which are different from ours and therefore the result will be different from ours. They take interest in matters purely physical; their physics reduces itself to a few theories about the action of heat and

cold on yams, and signs of the weather. These can throw no light on the geology of Kambara. It is human interests that are most developed. Their culture is almost entirely what we should call the humanities; that is history and custom, together with an elaborate theory of ghosts, spirits, incarnation, and so forth. It is therefore to human agency and to history that they will most readily look for the reason why there is so little good soil in Kambara and why so many *vesi* trees. We must therefore turn to their customs if we hope to understand their solution of the problem. An all-round study of their language, social organization, and religion reveals the following facts.

There is no proper word in Fijian "to create"; the nearest equivalent is the word *mbuli* which means "to form," "to shape," "to fashion," "to make into a heap." The word is also used of installing a chief. For our word "creation" they use *veimbuli* which also means the installation of a chief. Each tribe inland in Viti Levu has a tradition of a real installation that took place in a certain spot; at this ceremony they piled up earth to make the sacred foundation of the tribe, that is the foundation of the chief's or the god's house, it does not matter which, since the chief is a god.¹ A kava ceremony was also held in which the chief drank first, then the heads of clans. The effect of the ceremony appears to have been to install the chief as the representative of the god. When he died he was buried in the foundation. When the people migrated they dug up some of this soil and carried it with them to their new home,² where they proceeded "to shape it" (*mbulia*). You can still see at the present day the mounds thus "shaped" by the people of Ovalau in a certain place called "The Carried Earth"³ on that account. They did not only carry the sacred earth, but also their tribal tree⁴ to plant in their new home. In the interior of Viti Levu these ceremonies only took place once when the people

¹ I have set forth the evidence for this in a paper on "Chieftainship and the Sister's Son in the Pacific," *American Anthropologist*, N.S., Vol. 17, 631-646 (1915).

² Legend of Vunanggumu, MS. version. They called the soil "the soil of our sustenance" (*nggele ni keitou kakana*).

³ Nanggelandretaki.

⁴ J. de Marzan: "Histoire de la tribu de Vunanggumu," *Anthropos*, 1913, VIII, p. 880.

decided to have a sacred chief; but they still go on at the present day in Vanua Levu where they are called *mbuli vanua* or *tuli vanua* that is "fashioning the land." It is not clear whether the sacred land in Vanua Levu was the foundation of a house; but chiefs were buried in that land. In Vanua Levu these ceremonies are performed when the crops are bad; they are in a sense therefore a process of recreating the land.

In the light of this new knowledge the legend of Kambara becomes a plain statement of fact. Mberewalaki did bring soil from Oloi in Viti Levu, the sacred soil. He also brought thence a *vesi* tree as the tribal tree. He is called a god because chiefs were gods. The legend is confirmed by the close relationship existing to the present day between Kambara and Oloi.¹ The Kambara people also claim to come from Viti Levu.²

It is significant that legends of this type are only found where the custom of carrying the sacred soil on migrations has been forgotten. The myth could hardly arise where the nature and meaning of the custom is still known.

The conclusion is that the Kambara myth is a genuine bit of history; and it was used to explain certain features of the island, not expressly invented for that purpose. The tendency to explain the topography, fauna, and flora of a place by the action of the divine ancestor did not originate in Fiji, for it is very widespread, covering the whole of the Pacific. It is evident therefore that it originated outside and was brought into the Pacific where it received numerous local applications; men resorted to this theory on every occasion, just as ten or twenty years ago we saw evolution and natural selection everywhere.³ Local circumstances have given

¹ They are *lauvu*, that is "cross-cousins." *Journal Royal Anthropological Institute*, XLIII, p. 101.

² The legend of Mberewalaki says, not that he came from Oloi, but that he went there to get soil. There is no inconsistency: it is quite possible he should have gone back to their original home to get some of the sacred soil. Fijians always look back to their "sacred foundation" whence they migrated. In Vanua Levu they *renew* the "shaping of the land" if anything goes wrong.

³ Cp. R. H. Lowie, "Ceremonialism in North America," *American Anthropologist*, N.S., Vol. 16 (1914), p. 619. "Whenever such an idea is generally adopted within a tribe, it tends to assume the character of a norm that determines and restricts subsequent thought and achievement."

rise to local varieties of the theory that the divine ancestor is responsible for the topography of a place: in Polynesia he is supposed to have fished up the islands; in Fiji and Rotuma he is supposed to have brought the earth in baskets because it was the custom to carry about the sacred soil.

To us Europeans, who have our heads full of geological and biological preconceptions, it may seem impossible that rational beings should hold such theories. We are so used to our preconceptions that we think them self-evident and do not realize what centuries of tradition they represent. Banish those traditions from our mind and what is there impossible in a divine ancestor carrying tons of earth across the sea? There is nothing irrational about it; if a chief is endowed, like the Fijian and Polynesian chief, with miraculous power, *mana*, there is no limit to what he can do. Personal agency is still a favorite mode of explanation in Fiji; it is still suggested at times that the gods or ancestors caused this or that feature of the land, but these suggestions are advanced as cautiously as an unsupported hypothesis by a modern scientist; the author of them is fully aware that there is no evidence for them, and they die without passing into myth because tradition gives no warrant for them.

Let us pass to another myth of the same type.

The Rotumans relate that Raho embarked with his people in Samoa, taking with him two baskets of sand. They sailed westward till it seemed good to them to stop. They then began strewing the sand to make an island; but reflecting that they were too near the setting sun where cannibals live, they moved eastward leaving an unfinished island, the present reef of Vaimoan. The second time they made Rotuma, but as some of the sand had been wasted at Vaimoan they had only enough for a small island.

If this is an etiological myth it is a bad one, for Rotuma is not a bit sandy; it has beautiful black soil. But if we examine the myth in the light of installation ceremonies, this detail becomes quite logical. We saw that the sacred land in Fiji was the burial place of chiefs; there they bury in earth; but in Rotuma they bury in sand; they are most particular about it, and one objection a Rotuman has to dying abroad is that he would be buried in dirty earth. It is quite consistent therefore that they should carry sand about

as the sacred soil, not earth. This interpretation of the legend is confirmed by two memorials; one is a large rock on the beach where Raho first landed and on which he and his people are said to have made kava (we saw that kava was part of installation ceremonies); the second is a circular foundation close by, which was said to have been erected by them and which is sacred¹ (we saw that sacred foundations were set up at installations). We are further told that they did appoint a *Tuit e Rotuma*, or Lord of Rotuma. Putting all this together we may conclude that this is another case of "shaping the land." The sacred chieftainship in Rotuma has decayed till it has become a six-monthly office; and with it naturally decayed the whole of the theory upon which these "shapings of the land" were founded. It is only natural we should find the myth where the custom is lost.

Our own folklore supplies definite proof that an "etiological" myth is not necessarily invented to explain a thing, but may be a historical fact which suggested an explanation. In Shropshire and Oxfordshire "the dark marks across the shoulders of a donkey are said to be the sign of the cross imprinted in remembrance of Christ's triumphal entry into Jerusalem."²

Another class of legends is common roundabout Fiji. It tells of great competitions between the natives of some place and a party of visitors; the life of the defeated is at the mercy of the victors. These competitions always include an eating contest; each side is bound to eat all that the other provides and leave nothing over under forfeit of life. "That is a very common motive in fairy tales," you may say. "It is just the kind of thing a story teller would imagine to interest his hearers." But that is explaining nothing at all, and we want an explanation. It is perfectly obvious to any one who reads these legends that there is a historical foundation for them. I was long puzzled by them, and it is indeed only recently that I discovered the key in the Government Gazette for Fijians. Before quoting the writer, a native Fijian, I must

¹ A storekeeper has now set up his house upon it; but the natives were sure he would die.

² Mrs. E. M. Wright, *Rustic Speech and Folk-Lore*, p. 227.

explain the custom of *veitambani*: it is a variety of *tauvu* which I have already mentioned. *Veitambani* are intermarrying tribes or clans; the word means "related as one half to the other;" we might say they are moieties to one another. Like *tauvu*, *veitambani* abuse and plunder one another, but there are some other features:—

"*Tauvu* is one thing, *veitambani* another," says our writer, "*veitambani* are lands that vie with one another; it is a disgrace for them that the report should go that they have been overwhelmed or weak in war, or in exchanges, or in eating, or in drinking. It is better they should die in battle than run away, it is better that they should be poor than that their contribution of stuff to the exchange should be small, it is better that their bellies should burst and their stomachs be rent than that food and water should be left; it must all be eaten up."¹

One of these tales is about ten brothers who go to Tonga to marry ten sisters; therefore they and the Tongans with whom they hold a contest stand in the relation of *veitambani*, or intermarrying tribes.

We are all familiar with those fairy tales in which a king's daughter will not laugh, so her father, the king, promises big rewards to whosoever makes her laugh. We read that the Alaskan Eskimo on the first day of their inviting-in feast hold comic dances, and "if, during the day's dances, the home tribe can succeed in making the visitors laugh, they can ask of them anything they wish."² I do not wish to argue that these tales are derived from this Eskimo feast; it is a long way from Alaska to Europe. There is nothing impossible in a tale spreading all that distance, but there is no proof that it did. Here we have the difference between suggestion and proof; in our former cases we had all the connecting links; here we have none; we have merely a possibility that this custom and these tales have a common origin; it is a clue to follow up, a hypothesis to work upon. I will just point out that the custom may be fairly widespread: in Rotuma at the making of a state mat the women seize men as prisoners and keep them till they are ransomed, but if one can make them laugh he must be set free.

¹ *Na Mata* (1896), p. 172.

² The "Inviting-in Feast of the Alaskan Eskimo," by E. W. Hawkes, *Geological Survey of Canada*, Memoir 45, p. 12.

Of course they try hard not to laugh. Again this custom may have no connection with the Eskimoan; we lack evidence, but it is something to know that we lack it because then we shall seek for it.

It has been suggested by an American writer that the ordeals that occur in American tales are derived from the ordeals of initiation ceremonies. Unfortunately I have lost the reference and so cannot do justice to the writer.

I now come to a famous myth, that of Joshua stopping the sun. Biblical critics have suggested that this was originally a poetic metaphor which was later mistaken for literal truth. Unfortunately no evidence is adduced that metaphors ever do become myths; it is not impossible: in our present state of knowledge we cannot say that anything is impossible; but it does not seem very probable, and until a well-authenticated instance has been produced I find it easier to believe that Joshua did actually stop the sun. In the island of Lakemba, Fiji, there is a clump of reeds called "knotted reeds;" the belated traveller who passed that way would sign to the setting sun as if calling him, the word for this gesture being *yalovaki*, which is derived from *yalo*, "shadow," "image," "soul;" he then took a reed, made a knot in it, and held it fast till he got to the village; the night would not come on until, arrived at his destination, he threw the reed away. The idea seems to be that he had secured the shadow of the sun and tied it up in the reed. Again it is a far cry from Fiji to Palestine, and this is only meant as a suggestion, but it is not an absurd one. The idea that you can stop the sun is evidently a widespread one. In Rhodesia they "put a stone between the branch and stem of a tree to ensure reaching one's destination before sundown" and this is also done 2,000 miles to the north.¹ A belief that is found at three points so distant from one another is sure to be found in many other places; it is therefore *possible* that Joshua did stop the sun.

A notable example of a custom explaining a myth is the killing of the divine king. It is all the more notable as the custom was postulated to explain the myth, and was subsequently discovered as a fact. We cannot be far wrong therefore if we follow a clue which

¹ *Journal of Royal Anthropological Institute*, Vol. XXXIX (1909), p. 532.

in one case at least has given such brilliant results and has achieved the highest ambition of science, which is prediction. It is not every myth however that will yield its own explanation, nor every man that can extract it. Most collections of myths are therefore condemned to remain absolutely barren until quickened by a knowledge of arts, customs, and beliefs.

In bringing forward these myths I have no intention to suggest that all myths are custom misunderstood. I have no wish to add another hasty generalization to the swarms that infest anthropology. I have merely wished to show that if, instead of merely skimming through a myth, guessing its origin, and passing on to another, we make a systematic investigation of a region, leaving nothing untouched, despising no trifle, myths will explain themselves without any coaxing, and will spontaneously reduce themselves into common sense. It so happens that the myths we chose for illustration are partly based on old forgotten customs; in such a small collection this may well be a coincidence. As it is we have one, the origin of the ass's marks, which cannot be described as a misunderstood custom. In dealing with a myth we may use our previous experience as guide, but in the end each one must be judged on the merits of its own evidence. So long as the mythologist is content with taking myths in isolation and constructing a rationalized version out of his own head he can never get any further. There are so many possible ways of rationalizing a myth according to the temperament, bias, nationality, and age of the mythologist; but each of these remains a bare possibility with no power to convince any one. The truth may be very different from what we all expected, and that is only to be attained by a systematic study of the whole culture to which the myth belongs, together with neighboring cultures. Then the facts will force the conclusion on us, not we on the facts.

OXFORD, ENGLAND

THE ORIGIN OF TOTEMISM.¹

By FRANZ BOAS.

IN the numerous discussions of totemism published during the last few years much has been said about the "American theory" of totemism—a theory for which I have been held responsible conjointly with Miss Alice C. Fletcher and Mr. Charles Hill-Tout. This theory is based on the idea that the clan totem has developed from the individual manitou by extension over a kinship group. It is true that I have pointed out the analogy between totem legend and the guardian-spirit tale among the Kwakiutl, and that I have suggested that *among this tribe* there is a likelihood that under the pressure of totemistic ideas the guardian-spirit concept has taken this particular line of development.² Later on Mr. Hill-Tout³ took up my suggestion and based on it a theory of totemism by generalizing the specific phenomena of British Columbia. About the same time Miss Fletcher⁴ gave a wider interpretation to her observations among the Omaha. Mr. J. G. Frazer⁵ and Emile Durkheim⁶ both discuss my arguments from this point of view. Their interpretation of my remarks is undoubtedly founded on their method of research, which has for its object an exhaustive interpretation of ethnic phenomena as the result of a single psychic process.

My own point of view—and I should like to state this with

¹ Expanded from Tsimshian Mythology (*Annual Report of the Bureau of American Ethnology*, Vol. 31, pp. 515-518).

² *Bastian-Festschrift*, Berlin, 1896, p. 439; Report of the North-Western Tribes of Canada (*British Association for the Advancement of Science*, 1898, Reprint p. 48); see also Report on the North-Western Tribes of Canada, 1889, Reprint pp. 24 *et seq.*; "The Social Organization and the Secret Societies of the Kwakiutl Indians" (*Report U. S. National Museum for 1895*, Washington, 1897, pp. 332, 336, 662).

³ *Transactions of the Royal Society of Canada*, 1901-02, Vol. VII, Sec. II, pp. 6 *et seq.*

⁴ *The Import of the Totem, a Study from the Omaha Tribe* (Salem, Mass, 1897).

⁵ *Totemism and Exogamy*, IV, p. 48.

⁶ *Les formes élémentaires de la vie religieuse*, pp. 246 *et seq.*

some emphasis—is a quite different one.¹ I do believe in the existence of analogous psychical processes among all races wherever analogous social conditions prevail; but I do not believe that ethnic phenomena are simply expressions of these psychological laws. On the contrary, it seems to my mind that the actual processes are immensely diversified, and that similar types of ethnic thought may develop in quite different ways. Therefore it is entirely opposed to the methodological principles to which I hold to generalize from the phenomenon found among the Kwakiutl and to interpret by its means all totemic phenomena. I will state these principles briefly.

First of all it must be borne in mind that ethnic phenomena which we compare are seldom really alike. The fact that we designate certain tales as myths, that we group certain activities together as rituals, or that we consider certain forms of industrial products from an esthetic point of view, does not prove that these phenomena, wherever they occur, have the same history or spring from the same mental activities. On the contrary, it is quite obvious that the selection of the material assembled for the purpose of comparison is wholly determined by the subjective point of view according to which we arrange diverse mental phenomena. In order to justify our inference that these phenomena are the same, their comparability has to be proved by other means. This has never been done. The phenomena themselves contain no indication whatever that would compel us to assume a common origin. On the contrary, wherever an analysis has been attempted we are led to the conclusion that we are dealing with heterogeneous material. Thus myths may be in part interpretations of nature that have originated as results of naïvely considered impressions (*Naturanschauung*); they may be artistic productions in which the mythic element is rather a poetic form than a religious concept; they may be the result of philosophic interpretation, or they may

¹ "The Origin of Totemism" (*Journal of American Folk-Lore*, XXIII, 1910, p. 392); "Some Traits of Primitive Culture" (*ibid.*, XVII, 1904, p. 251); *Psychological Problems in Anthropology*, Lectures and Addresses delivered before the Department of Psychology and Pedagogy in celebration of the Twentieth Anniversary of Clark University, Worcester, 1910, pp. 125 *et seq.*; see also *The Mind of Primitive Man*, pp. 174 *et seq.*

have grown out of linguistic forms that have risen into consciousness. To explain all these forms as members of one series would be entirely unjustifiable.

What is true of wider fields of inquiry is equally true of narrower fields. Decorative art as applied by an artist who devotes much time and an inventive genius to the making of a single beautiful object, and decorative art as applied in factory production, which occurs in certain primitive industries as well as in modern industries, are not comparable, for the mental processes applied in these two cases are not alike. Neither are the free invention of design in a familiar technique and the transfer of foreign designs from an unfamiliar technique to another familiar one comparable. To disregard these differences and to treat decorative art as though the psychological processes involved were all of the same character means to obscure the problem.

The phenomenon of totemism presents a problem of this kind. A careful analysis shows that the unity of this concept is a subjective, not an objective one.

I quite agree with the view of Doctor Goldenweiser,¹ who holds that the specific contents of totemism are quite distinct in character in different totemic areas. Common to totemism in the narrower sense of the term is the view that sections of a tribal unit composed of relatives or supposed relatives possess each certain definite customs which differ in content from those of other similar sections of the same tribal unit, but agree with them in form or pattern. These customs may refer to taboos, naming, symbols, or religious practices of various kinds, and are in their special forms quite distinctive for different totemic areas. There is no proof that all these customs belong together and are necessary elements of what Doctor Goldenweiser calls a "totemic complex." Since the contents of totemism as found in various parts of the world show such important differences, I do not believe that all totemic phenomena can be derived from the same psychological or historical sources. Totemism is an artificial unit, not a natural one.

¹ "Totemism, an Analytical Study" (*Journal of American Folk-Lore*, XXIII, 1910, pp. 179 *et seq.*).

I am inclined to go a step farther than Doctor Goldenweiser does in his later publications. I consider it inadvisable to draw a rigid line between totemic phenomena in a still more limited sense,—namely, in so far as the characteristics of tribal exogamic sections deal with the relations of man to animals and plants,—but believe that we should study all the customs connectedly, in their weaker form as well as in their most marked totemic forms.

Although we must lay stress upon the subjective character of the groups that we isolate and make the subject of our studies, it is important to bear in mind that the processes by which extended groups of mental activities are systematized by retrospective thought (that is by reason), occur also as an ethnic phenomenon in each social unit, so that the unification of heterogeneous material that we attempt as an ill-founded scientific method, is only one aspect of a wide range of ethnic phenomena, the essential feature of which is the remodeling of activities, thoughts, and emotions under the stress of a dominant idea. Thus, in the case of totemism the dominant idea of exogamic division has attracted the most varied activities of most diverse origin which now appear to the people themselves as a unit, and to us as a problem that we are tempted to solve as though it were the result of a single historical process, and as though it had its historical origin in a single psychological condition. I have discussed associations of this type in one of the essays to which I referred before.¹

It follows from this consideration, that under the stress of a uniform dominant idea analogous forms may develop from distinct sources. Thus I do not feel convinced that the substratum of the totemism of the tribes of northern British Columbia and southern Alaska must have been the same. On the contrary, there seems to be evidence showing that their beginnings may have been quite different. Still, historical contact, and the effect of the idea of privilege attached to position, seem to have modeled the totemic customs of these tribes and of their southern neighbors, so that they have assumed similar forms. We call this development from distinct sources "convergence," no matter whether the assimilation is brought about by internal psychic or by external historical causes.

¹ *Some Traits of Primitive Culture*, 1904.

In order to state my position in regard to the theoretical problem definitely, I have to add a third point. Wundt¹ and Durkheim² use the term "totemic viewpoint" in a sense quite different from the one that I am accustomed to connect with it. While they do not disregard the connection between social group and totemic ideas, they lay stress upon the identification of man and animals; that is, a characteristic feature of totemism in the most restricted sense of the term. This idea occurs in many other aspects of the mental life of man,—in his magic, art, etc. Neither is this view an essential part of the totemic complex in its widest sense. It seems to me that if we call this the basis of totemic phenomena, one trait is singled out quite arbitrarily, and undue stress is laid upon its totemic association. It appears to me, therefore, an entirely different problem that is treated by these authors,—a problem interesting and important in itself, but one which has little bearing upon the question of totemism as a social institution. Their problem deals with the development of the concepts referring to the relation of man to nature, which is obviously quite distinct from that of the characterization of kinship groups. The only connection between the two problems is that the concepts referring to the relation of man to nature are applied for the purpose of characterizing social, more particularly kinship groups.

I am inclined to look at the totemic problem as defined before in a quite different manner. Its essential feature appears to me the association between certain types of ethnic activities and kinship groups (in the widest sense of the term), in other cases also a similar association with groups embracing members of the same generation or of the same locality. Since, furthermore, exogamy is characteristic of kinship groups, endogamy of generation groups or local groups, it comes to be the association of varying types of ethnic activities with exogamy or endogamy. The problem is, how these conditions arose.

The recognition of kinship groups, and with it of exogamy, is a

¹ *Völkerpsychologie*, Vol. II, Part 2 (1906), pp. 238 *et seq.*; *Elemente der Völkerpsychologie*, 1912, pp. 116 *et seq.*

² *Les Formes Élémentaires de la Vie Religieuse*.

universal phenomenon. Totemism is not. It is admissible to judge the antiquity of an ethnic phenomenon by its universality. The use of stone, fire, language, is exceedingly old, and it is now universal. On this basis it is justifiable to assume that exogamy also is very old. The alternative assumption, that a phenomenon of universal occurrence is due to a psychic necessity that leads to it regularly, can be made for the kinship group, not for the other cases. We may, therefore, consider exogamy as the condition on which totemism arose.

When exogamy existed in a small community, certain conditions must have arisen with the enlargement of the group. The size of the incest group may either have expanded with the enlargement of the group, or individuals may have passed out of it, so that the group itself remained small. In those cases in which, perhaps owing to the ever-recurring breaking-up of the tribes into smaller units, cohesion was very slight, the exogamic group may always have remained restricted to the kinship group in the narrow sense of the term, so that there must always have been a large number of small co-ordinate independent family groups. A condition of this type, which is exemplified by the Eskimo, could never lead to totemism.

On the other hand, when the tribe had greater cohesion, the consciousness of blood relationship may well have extended over a longer period; and if the idea of incest remained associated with the whole group, a certain pressure must soon have resulted from the desire to recognize at once an individual as belonging to the incest group. This may be accomplished by the extension of the significance of terms of relationship, by means of which the members of the incest group may be distinguished from the rest of the tribe. Many systems of relationship include such a classification of relatives; but with increasing size of habitat or tribe, this form must also ultimately lead to the passing of individuals of unknown relationship out of the incest group.

The assignment of an individual to the incest group is easiest when the whole group is given some mark of recognition. As soon as this existed, it became possible to retain the incest or exogamic group, even when the family relationship of each individual was

no longer traceable. It is not necessary that such an assignment should be made by naming the group. Common characteristics, like a ritual or symbols belonging to the whole group, would have the same result.

It is obvious that this characterization of an incest group presupposes the development of the concept of the unilateral family. Where this concept does not prevail, permanent differentiation of subgroups of the tribe can hardly develop. The origin of the unilateral family must probably also be looked for in the conditions of life of the primitive economic group. Where permanent marital relations prevailed, and both maternal and paternal lines were represented in the economic group, conditions for the development of a unilateral family were absent. A case of this kind is presented by the Eskimo. Where, however, marital conditions were unstable and the women remained members of the parental economic group, maternal descent was the only one possible. Where in the case of more permanent marital relations either husband or wife separated from his or her parental group and joined the opposite parental group, conditions favored the growth of unilateral families. Such changes of domicile may have been determined by a variety of considerations. They would result even in primitive conditions where property right in the man's hunting territory existed, and in which, therefore, the strange woman would join the economic group of the man. We might expect in this case the development of paternal families. When, on the other hand, property right in agricultural land prevailed, the man may have joined the woman's group and a maternal family would have developed. Possibly this may be related to the prevalence of maternal descent among the agricultural tribes of North America.

It is not my aim to follow out here the development of the unilateral family. I merely wish to point out that a varied development may be expected under varying primitive conditions.

It will readily be seen that the elements of totemic organization are given wherever a unilateral family is designated by some characteristic feature.

Furthermore, wherever unilateral descent prevails, either

paternal or maternal, there must be a tendency towards a decrease of the number of lines that constitute the exogamic units. This must be the case the more, the smaller the number of individuals constituting the tribal unit and the slower the rate of increase of population. If we assume as initial point a number of women, all representing distinct lines, then all those men (or women) whose descendants do not reach maturity and those who have only sons (or daughters, as the case may be) will not become originators of lines, and obviously the number of lines will decrease with the progress of generations, unless this tendency is counteracted by new accessions or by sub-division into new lines. In small social units the reduction would continue until only two exogamic units are left. Historical evidence of the extinction of unilateral families is represented in the disappearance of families of the European nobility.¹

The three lines of development, namely the restriction of the incest group to the family without the occurrence of large exogamic groups, the extension of terms of relationship over larger groups, and the naming or other characterization of exogamic groups are all represented in the ethnological data that have been collected.

If the theory outlined here is correct, we must expect to find a great variety of devices used for the purpose of characterizing exogamic groups, which must develop according to the general cultural type to which the people belong. It is obvious that in such cases, when the characterization of the group is due to the tendency to develop a distinguishing mark, all these marks must be of the same type, but different in contents. It does not seem plausible that distinguishing traits should belong to entirely distinct domains of thought; that one group might be recognized by a name, another one by a ritual, a third one by crests or emblems. The fundamental principle of classification as manifested in the mental life of man shows that the basis of classification must always be founded on the same fundamental concepts. We may conclude, conversely, that the homology of distinguishing marks of social divisions of a tribe is a proof that they are due to a classificatory tendency.

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¹ Fahlbeck, *Der Adel Schwedens*.

TERMS OF RELATIONSHIP AND THE LEVIRATE

By E. SAPIR

REVIVED interest has been manifested of late in the relation which exists between systems of consanguinity and affinity on the one hand, and specific types or features of social organization on the other. It is to Rivers that we chiefly owe this revival of interest and it is he who, by discussion and example based chiefly on Melanesian material, has conclusively shown that many groupings of kinship terms are best understood as expressive of particular types of marriage. True, many of Rivers' inferences seem far-fetched and there is no necessity of following him in detail, but his main argument is certainly sound.¹

A widespread marriage custom among American Indians, and other peoples as well, is that of the levirate, in other words the custom by which a man has the privilege or, more often, duty of marrying the widow of his deceased brother and of bringing up the offspring

¹ Lowie has tried to show that Rivers' line of argument is in many cases too exclusive in character, that he has explained by a specific form of marriage what would equally well result from a more general feature, that of group exogamy. It seems to me, however, that Lowie's own arguments are in part invalidated by his failure to show why only certain relationships covered by the same exogamic rule are included under a single term. In not at the same time defining the reasons for specific delimitation he may prove too much. Personally I believe that the factors governing kinship nomenclature are very complex and only in part capable of explanation on purely sociological grounds. In any event, I do not seriously believe that thoroughly satisfactory results can be secured without linguistic analysis of kinship terms. Moreover, for the proper historical perspective we must have some feeling for the lack of strict accord between linguistic and cultural change. This means that an existing nomenclature may be retained, at least for a time, in the face of sociological developments requiring its modification. Direct sociological interpretation of descriptive kinship data may be as unhistorical as any other mode of direct interpretation of descriptive cultural facts. However, the purpose of this brief paper is not a polemic or broadly methodological one. It aims merely to call attention to a specific type of marriage as determining part of the kinship nomenclature. Some of the facts instanced in the text are instructive because, without other evidence, one might have inferred from them the actual or former existence of group exogamy. This inference, fortunately, we know to be impossible for the Yana and Chinook.

of their union in his own household. Correlative to this is the custom by which a man has the privilege or duty of marrying the as yet unmarried sister of his deceased wife. For convenience we shall consider these two customs as different forms of the levirate. How can the levirate form of marriage find expression in kinship nomenclature? Obviously in two distinct ways. We may look upon the levirate as an accomplished fact, in which case it remains to define step-relationship in terms of the nepotic relationship, *i. e.*, step-father as uncle, step-mother as aunt, step-child as nephew or niece. A reflection of the levirate in nomenclature naturally demands the identification of the step-father and step-mother with the paternal uncle and maternal aunt respectively in such tribes as possess distinct terms for paternal and maternal uncle, and paternal and maternal aunt; correlatively, in those tribes that distinguish between brother's and sister's children we must look for an identification of the step-child with the man's brother's child and the woman's sister's child. Or, secondly, we may look upon the levirate as a potential fact, in which case it remains to define certain nepotic and ensuing relationships in terms of the filial (and fraternal) relationship, *i. e.*, paternal uncle as father, maternal aunt as mother, man's brother's child as son and daughter, woman's sister's child as son and daughter, children of father's brother and mother's sister as brothers and sisters (as distinguished from "real" cousins, *i. e.*, cross-cousins). We may also expect to find a man's sister-in-law and a woman's brother-in-law referred to as wife and husband respectively. I propose to show that such peculiarities of kinship nomenclature actually follow, as consequences of the levirate, among the Upper Chinook¹ and the Yahi or Southern Yana.²

The identification of step-relationship with the nepotic relationship is complete among the Upper Chinook. The nepotic relationships recognized by these Indians are as follows:—

¹ Wishram tribe, in Southern Washington. Data taken from as yet unpublished material secured at Yakima reserve in 1905. For orthography of Wishram terms see my "Wishram Texts," *Publications of the American Ethnological Society*, Vol. 2, 1909.

² In northern California. Data taken from material recently (summer of 1915) obtained from Ishi, the last known survivor of the tribe. Data, as yet unpublished, on the kinship terms of the Northern and Central Yana were obtained in 1907. For orthography of Yana see my "Yana Texts," *Univ. Calif. Publ. Am. Arch. Ethn.* Vol. 9, 1910.

*i-mu*¹ "paternal uncle" (vocative *amu*).

i-lēm "maternal uncle"² (vocative *alēm*).

*a-lak*¹ "paternal aunt" (vocative *alak*).

a-gulx "maternal aunt" (vocative *agulx* or *aqxôda*).

{ *i-wulx* "man's brother's son; woman's sister's son" (vocative *qxēwulx*).

{ *a-wulx*³ "man's brother's daughter; woman's sister's daughter" (vocative *qxēwulx*).

{ *i-latxan* "man's sister's son" (vocative *qxēlatxēn*).

{ *a-latxan*³ "man's sister's daughter" (vocative *qxēlatxēn*).

{ *i-lkiu* "woman's brother's son."

{ *a-lkiu*³ "woman's brother's daughter."

The step-relationships which are identical with certain of these terms are:—

i-mul "step-father."

a-gulx "step-mother."

{ *i-wulx* " (man's or woman's) step-son."

{ *a-wulx*³ " (man's or woman's) step-daughter."

These facts speak for themselves. Their dependence on the levirate is too obvious to call for extended discussion. I need only add that the levirate itself is known to have been in force among most or all of the tribes of Washington and Oregon. We may infer with some degree of plausibility, for the Upper Chinook, that it was the very custom of the levirate, more specifically the fact that both the man's brother's child and the woman's sister's child were alike potentially the step-children, that was responsible for the grouping of these two relationships under a single term in contrast to the distinctive terms for the man's sister's child and the woman's brother's child.

Fully as instructive are the Yahi data.⁴ They are all the more

¹ *i-* is masculine prefix, *a-* is feminine prefix. In actual usage the terms are practically always provided with possessive elements, e.g., *i-ya-mul* "his paternal uncle," *a-ga-wulx* "her sister's daughter."

² Boas gives *i-tata* for this relationship in Lower Chinook. In Wishram this term is used by little children for "(older) brother."

³ These terms are identical, differing only in the gender prefix.

⁴ Ishi, the informant, spoke very little English, but I consider the full data on kinship terms that I obtained from him, aside from a few doubtful points, as thoroughly reliable. This is due to the fact that the terms were collected very slowly and with the utmost care and circumspection, with repeated checking-up whenever opportunity was offered; further to the fact that data already obtained from the Northern Yana

significant in that the informant made it perfectly clear that he himself looked upon the facts that we are about to consider as simply another way of saying that it was customary for the widow to marry her former husband's brother and for the widower to marry his former wife's sister. The Yahi terms for parents and children, in so far as they are necessary for our argument, are:—

galsi "father" (vocative *galsinā*, *galsī*¹).

ganna "mother" (vocative *gannā*).

'i'sip'la "son" (literally "little man") or *'i'sip'ai'amauyāhi* (literally "person who is little man").

mari'mip'la "daughter" (literally "little woman") or *mari'mip'ai'amauyāhi* (literally "person who is little woman").

The terms involving the nepotic relationship are:—

galsi "paternal uncle" (vocative *galsinā*, *galsī*).

u'dji'yauna "maternal uncle" (vocative *u'dji'yaunā*, *u'dji'yanu*)².

mucdi "paternal aunt" (vocative *mucdī*).

ganna "maternal aunt" (vocative *gannā*).

'i'sip'la "man's brother's son; woman's sister's son" (vocative *'i'sip'anā*, *'i'sip'ā*).

mari'mip'la "man's brother's daughter; woman's sister's daughter" (vocative *mari'mip'anā*, *mari'mip'ā*).

u'dji'yauna "man's sister's son" (vocative *u'dji'yaunā*); "man's sister's daughter" (vocative *u'dji'yanu*).

mucdi "woman's brother's son, daughter" (vocative *mucdī*).

These lists show that the paternal uncle, as a potential father, is termed father; and the maternal aunt, as a potential mother, mother. As a necessary correlate of this we find that the man's brother's son and daughter, and the woman's sister's son and daughter, as potential children, are termed son and daughter. On the

helped me to follow the informant. The many agreements in nomenclature between the Yahi and Northern Yana systems are in no case due to suggestion on my part. The work was rendered possible by the use of counters, differing in appearance for males and females, arranged in the form of a genealogical tree; this device put the whole investigation on a directly visible footing. My familiarity with Northern and Central Yana (by that time also of Yahi) naturally also helped, though the language of the discussion itself was a crude jargon composed of English, quasi-English, and Yahi.

¹ The vocative in *-nā* is used by males, that in a final lengthened vowel (or diphthong) by females. This applies to all other cases in which two vocative forms are given.

² Related to *u'dji-* "to be old."

other hand, the maternal uncle and the paternal aunt are designated by distinctive terms, the correlative nephew or niece being in each case designated by the same term. In other words, the kinship terms involved in the nepotic relation fall into two very distinct groups: such as, through the custom of the levirate, have become identified with the filial relation and recognize the difference of generation, and such as enter into reciprocal pairs in which the difference of generation is not recognized. The latter type of kinship term also includes the terms for grandparents and grandchildren.

There is, furthermore, a specific term applied to the man's brother's son or daughter, *wa'dāt'imauna* (plural *yēidāt'imauna*). The analysis of this term, however, would seem again to show dependence on the levirate. *wa'*-, to which *yēi*- corresponds as plural, is a verb stem meaning "to sit" but apparently also, when followed by an incorporated noun stem, conveying the idea of "to have, consider as"; *dāt'i* is a term for "child," regardless of sex; *-mauna* is participial. The term would therefore seem to mean "had, considered as own child," *i. e.*, potential son or daughter according to the levirate. The Northern Yana term for the man's brother's son is the cognate *wadāt'imauna*, for the man's brother's daughter *wadāt'imaumari'mi*, which is the same term compounded with the word for woman, *mari'mi*. A division into two kin groups of necessity prevails also in the cousin relationship. Cross-cousins, *i. e.*, cousins related through parents of opposite sex, are designated by special terms (*'ō'yanmauna* and *'a'yansiya*; their exact definition does not concern us here), while cousins related through parents of like sex are brothers and sisters. In other words, if my paternal uncle and maternal aunt are my potential father and mother, their children must be my potential brothers and sisters. The nomenclature for the fraternal relationship, including its application to cousins, is as follows:—

du'yauna "man's older brother" (vocative *du'yaunā*); also "paternal uncle's son older than male self, maternal aunt's son older than male self."

tle'yauna "man's younger brother" (vocative *tle'yaunā*); also "paternal uncle's son younger than male self, maternal aunt's son younger than male self."

mari'mi'yauna "man's sister" (vocative *mari'mi'yaui*); also "man's paternal uncle's daughter, man's maternal aunt's daughter."

'i'si'yauna "woman's brother" (vocative *'i'si'yaui*); also "woman's paternal uncle's son, woman's maternal aunt's son."

dul'mari'mi "woman's older sister" (vocative *dul'mari'mi*); also "paternal uncle's daughter older than female self, maternal aunt's daughter older than female self."

t!et'womāri'mi "woman's younger sister" (vocative *t!et'womāri'mi*); also "paternal uncle's daughter younger than female self, maternal aunt's daughter younger than female self."

As indicated in detail, the terms "older" and "younger" refer to the relative ages of the parties directly involved in the fraternal relationship, not to the relative ages of their parents.¹

The levirate is further reflected in the Yahi kinship system in the terms for the wife's sister and the husband's brother, which, as applying to potential wife and husband, are identical with the terms for these:—

'i'si "husband" (literally "man, male"); also "husband's brother."

mari'mi "wife" (literally "woman"); also "wife's sister."

Whether these terms also apply to the woman's sister's husband and the man's brother's wife respectively I do not know, as I have no data on this point, but it seems quite likely from the general analogies of the Yahi system that this is the case. This would be further confirmed by the fact that in Northern Yana a single term (*u'nai-yāna*) is used for the wife's sister, the man's brother's wife, the husband's brother, and the woman's sister's husband; this term would thus seem to be about equivalent to "potential spouse." On the other hand, the wife's brother, the man's sister's husband, the husband's sister, and the woman's brother's wife are each designated, in both Northern Yana and Yahi, by a distinctive term; these terms differ only phonetically in the two dialects.

The influence of the levirate on Yahi kinship nomenclature may be still further pursued in certain other terms of affinity. The paternal uncle's wife and the maternal aunt's husband are not

¹ As is the case in other kinship systems, e.g., that of the Takelma and Nootka. Thus, among the Nootka, the older brother's or older sister's son A is the "older brother" of his or her younger brother's or younger sister's son B, whether A is actually older or younger than B.

typical potential mother and father respectively, but the former, as the potential father's wife, may become a step-mother (or better perhaps co-mother); while the latter, on the death of one's brotherless father, may take the widow to wife and thus become a step-father. However, the terms "mother" and "father" are not respectively used for the paternal uncle's wife and the maternal aunt's husband. The special terms in use for these relationships are:—

p'êmo'o "paternal uncle's wife" (vocative *p'êmo'onā*, *p'êmo'ô*).

'āp'dju'wīyauna "maternal aunt's husband" (vocative *'āp'dju'wīyaunā*).

The significance of the term *p'êmo'o* for our problem will become apparent in a moment. While the *'āp'dju'wīyauna* himself is not named so as to refer to the levirate, it is highly significant as indicative of this custom that he was said by Ishi to address his wife's children as his own children, thus implying a potential fatherhood in himself.¹ Equally significant is the term applied by a woman to her husband's brother's child, *dāt'ip!a* (vocative *dāt'ip!ā*), for this is simply the diminutive of *dāt'i* "child." In other words, as the potential step-mother (or co-mother, for we are dealing with a polygamous society), she addresses her husband's brother's children as her children.²

We may now take up the Yahi terms for the step-relationship. They are:—

wā'nimāsī "step-father; man's step-child" (vocative *wā'nimāsīnā*, *wā'nimāsī*).

p'êmo'o "step-mother" (vocative *p'êmo'onā*, *p'êmo'ô*).

dāt'ip!a "woman's step-child" (vocative *dāt'ip!ā*).

The last term, in spite of its literal meaning ("little child"), is used by a woman even for a grown-up step-child. The most striking point about this step-nomenclature is the identity of the step-mother-step-child relation with that of the paternal uncle's wife

¹ I must hasten to add, however, that Ishi's statements on this point were not such as to leave absolutely no doubt as to his true meaning.

² Whether *dāt'ip!a* is an inclusive term for *'i'sip!a* "son" and *mar'i'mip!a* "daughter," as its etymology implies, or is restricted in use to this and the step-relation mentioned further on, I do not know. In Northern and Central Yana *dāt'i* is the regular term for "child," but Ishi considered this word, without the diminutive suffix, as peculiar to those dialects.

to the husband's brother's child, a clear indication of one form of levirate marriage. The term *wa'nimāsi*, which is used reciprocally, finds no parallel, so far as my data go, in the Yahi kinship system, but comparison with Northern Yana demonstrates that it too is symptomatic of the levirate—and in a manner, indeed, directly comparable to the Upper Chinook usage. Its Northern Yana cognate is *un'īma* (vocative *un'īmanā*), which means "paternal uncle." This correspondence is of course indicative of the direct and most typical form of levirate, the marriage by a man of his brother's widow. It further implies the former use in Yahi of *wa'nimāsi* for the paternal uncle, its displacement, under the influence of the levirate, by the term for "father," and its survival in a specialized sense ("step-father").

This leads us to a point of considerable interest, the geographical distribution of the kinship terms implying the levirate. For some reason which I am at present unable to give, the identification of the paternal uncle with the father and of the maternal aunt with the mother is peculiar to Yahi, while the Northern and Central Yana have distinct terms for each of the four types of uncle and aunt. The Northern Yana terms are:—

un'īma "paternal uncle."

udjī'auna "maternal uncle" (cf. Yahi *u'dji'yauna*).

muxdi "paternal aunt" (cf. Yahi *mucdi*).

garaina "maternal aunt."

The terms *un'īma* and *garaina* are not capable of analysis and must therefore be of very considerable antiquity. Moreover there was good internal evidence in Yahi, as we saw, pointing to the former existence in that dialect of *wa'nimāsi* in the sense of "paternal uncle." From these facts we conclude that the Yahi peculiarities of terminology are secondary and that the influence upon it of the levirate was not on the wane, but on the increase. It would be highly interesting to have the Northern Maidu kinship system available for comparison in order to determine whether this emphasis on the levirate is due to a southern influence, but unfortunately such material has not been made accessible.

The influence of the levirate on kinship terminology is doubtless

traceable in other systems, and perhaps much of what has been explained with reference to other causes is ascribable to it. I should certainly not be disposed to hold, for instance, that the merging of lineal and collateral lines of descent necessarily points to the custom of group exogamy. The levirate may no doubt not infrequently be examined as an equally or more plausible determining influence.¹ Various features of a kinship system may be interpreted as symptomatic of the levirate, but care must always be taken to see whether in any specific case other explanations may not be more appropriate. One such symptomatic feature is the classification of cousins related through parents of like sex as brothers and sisters. The classification of all cousins as brothers and sisters, as among the Nootka, is naturally of no significance in connection with the levirate. A typical instance of the former mode of cousin classification I find among the Takelma, a tribe of southern Oregon. Among these Indians the term for "younger brother" (*wā^a-xa*) was also applied to the father's younger brother's son and to the mother's younger sister's son; the term for "older brother" (*op-xa*) also to the father's older brother's son and to the mother's older sister's son; the term for "younger sister" (*t'awā^a-xa*) also to the father's younger brother's daughter and to the mother's younger sister's daughter; and the term for "older sister" (*t'op-xa*) also to the father's older brother's daughter and to the mother's older sister's daughter. The cross-cousins, on the other hand, are classed partly with the paternal uncle and maternal aunt and partly under a distinctive kinship term. It may well be significant in connection with these facts that the levirate was obligatory among the Takelma.

The identification in nomenclature of the wife's sister or man's brother's wife with the wife, and of the husband's brother or woman's sister's husband with the husband, is also good presumptive evidence of the presence of the levirate. Thus, for the Tlingit, Swanton expressly states: "A woman's sister's husband was called

¹ To avoid misconception, I wish expressly to state that I do not consider the explanation here given of certain features of kinship terminology to hold generally, but only in the two groups of cases specifically dealt with. Other possible applications of my line of argument must be examined on their merits.

husband; and a wife's sister, wife, because in case of the wife's death, the widower had a right to marry her sister."¹ That this "right" was really a duty and that both forms of levirate marriage are customary among the Tlingit is indicated by the following quotation from a recent work on the tribe:—²

The levirate custom regulates many marriages; that is, when a brother dies some one of his surviving brothers must take his widow to wife. . . . On the other hand, if the wife dies, then a sister of the deceased, or a close relative, must be given to the surviving husband for a wife.

How much a matter of course the levirate is with the Tlingit may be gathered from further remarks of the author:—

In levirate marriages no presents are passed from the man's people to the people of the woman he takes to wife, for this is only making good his loss. The surviving husband has the right even to select a married sister of his deceased wife. If this is done, she must leave her husband and become the widower's wife. Or the widow has the right to select even a married brother of her deceased husband. And if this is done, the husband must leave his wife and children and become the widow's husband.³ The writer is acquainted with more cases than one of this kind.⁴

In several Shoshonean languages there are similar examples of nomenclature. Thus, in Shoshone the term *neg-wi'* "my husband; my wife," means also "my brother's wife" (male speaking) and "my husband's brother."⁵ Further, in Southern Paiute the terms *naiη-quma-n'i* "my sister's husband; my husband's brother" (female speaking) and *naim-piηwa-n'i* "my brother's wife; my wife's sister" (male speaking) are evidently derivative forms of *quma-n'i* "my husband" and *piηwa-n'i* "my wife" respectively and probably signify something like "my co-husband, my co-wife," or "my possible husband, wife." Many other examples could doubtless be found in America of this type of nomenclature. Among the Shoshonean tribes of the Plateau, aside from the Hopi, there

¹ See J. R. Swanton, "Tlingit, Handbook of American Indian Languages," *Bureau of American Ethnology*, Bulletin 40, p. 196.

² See Livingston F. Jones, *A Study of the Thlingets of Alaska*, Fleming H. Revell Co., 1914, p. 129.

³ Presumably not in earlier days, when polygamy was practised. E. S.

⁴ *Ibid.*, pp. 129, 130.

⁵ Information obtained at Uintah Reserve, Utah, from Charlie Mack, summer of 1909.

can be no talk of group exogamy. The levirate is ready to hand as a plausible explanation.

Terms denoting step-relationship are also peculiarly apt to be symptomatic of the levirate, as we have seen. I believe that this brief study has served to accentuate the special importance in a study of the relation between kinship and social organization of considering the nomenclature of step-relationship.

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THE ZUÑI A'DOSHLĒ AND SUUKĒ

By ELSIE CLEWS PARSONS

OF that docility of the Pueblo child, so striking even to the least observant, the discipline of fear, I had often surmised, was an important factor, fear not so much of their elders *per se*—the Pueblo elder punishes very infrequently—as fear of the unknown or the supernatural inspired by their elders. Once at Cochiti I had seen a three year old child bury his head in his mother's lap, panic-stricken at the hoot of the owl she had imitated. She was mimicking for my benefit, for I had asked her what a mother would do to scare her child into being good. That the owl will kidnap a refractory or a crying child, or, the more common version, that the owl will pick out its eyes is, I have been at some pains to make sure, a widespread Pueblo threat.¹ The child is also threatened with the coyote. At Sia I once saw a mother terrify a little fellow in the conventional white American style by pretending to give him over to the Santa Clara visitor who was on the point of leaving her house. "The Navajo will get you," was the warning once popular in Zuñi. Nowadays, it is the snakes who attack a straying child. "You will come home with snakes hanging to your legs,"² I overheard a Zuñi mother declare to her adventure-

¹ Boas has noted it too in the Northwest. The Bear clan of the Nisk'a' of the Nass River, British Columbia, have a tradition that once a chief, impatient with his cry-baby son, sent him out of doors, saying, 'The white owl shall fetch you.' The boy's sister went out with him and it was she the owl carried off, taking her to a high tree to marry her. There is an owl headdress to commemorate this tradition. ("Fifth Rep. on the Indians of British Columbia," *Rep. of the Brit. Assn. for the Adv. of Sc.*, 1895). Scare owls of sumac were actually made by the Navajo and hung up in the evening to a beam of the hogan to subdue insubordinate children. "The fancy of a child might be easily led to believe that the owl sitting there should carry it off." (*An Ethnologic Dictionary of the Navaho Language*, p. 495. The Franciscan Fathers, Saint Michaels, Arizona)

² The Caddo in Oklahoma tell their children that Snake-Woman, the giver of all their seeds, has said that until the seeds are ripe they belong to her. None, especially children, may touch or even point to them as they grow. If one did, Snake-Woman would send a poisonous snake to bite him. (Dorsey, G. A., *Traditions of the Caddo*, p. 18, Washington, 1905.)

some six year old, the same youngster who the year before had burst into a howl one night over the story of Koluwitsi and the Zuñi maiden he had embraced in his coils. That such alarming tales are told without restraint in the presence of young children, that for their benefit their elders' overwhelming dread of witchcraft is never covert,¹ these circumstances must also be influential in increasing childish apprehensiveness.

But it is to the adoption at Zuñi of a more deliberate method of the use of fear as a discipline of childhood I wish to draw attention, to the dependence of the elders upon masks whose special function is that of terrifying the younger children. These disciplinary figures are in use I believe in the Rio Grande pueblos and among the Hopi. The disciplinary activities of the Cooyoktu katchinas during the Powamu ceremony² are markedly analogous to those of the *a'doshlě* and *suukě* at Zuñi. At various times I have heard Santa Clara and Cochiti Indians refer to scaring children by such a figure. Harrington refers to him as *tsabijc*, a divine personator who "goes about on certain occasions whipping the children of the village." Harrington adds that he is always called *t'ĕtĕ*, grandfather.³ In this connection the derivation of the word *a'doshlě* is of considerable interest. It is, I believe,⁴ from the plural prefix *a* and *doshle*, an age class term meaning very old, older than a grandfather. This term is used by the Zuñi only in referring to the gods, that is, it is obsolete except as preserved in sacerdotal

¹ In Zuñi children are deliberately threatened too with the witch, the *halikwe*. A very intelligent and enterprising twelve-year-old girl, my companion at night under the stars, would never climb the ladder to the roof before I did—she was too afraid of the witches. One night we heard young men singing as they took some horses to pasture. "They are singing to keep off the witches," remarked my young friend. I recalled that a Santa Clara man with whom I once took an interpuablo riding trip used to sing when he rode ahead of me after dark. It struck me at the time as odd for he was a dour and rather melancholy man and he never sang in the daytime. Among the Navajo singing is recommended to those riding alone after dark. (*An Ethnologic Dictionary of the Navaho Language*, pp. 507-511. The Franciscan Fathers. Saint Michaels, Ariz. 1910.)

² Voth, H. R. "The Oraibi Pawamu Cremony," p. 118. *Field Columbian Museum, Anthropol. Ser.*, Vol. III, No. 2, Chicago, 1901; Fewkes, J. W. "Hopi Katchinas," *21st Ann. Rep. Bur. Amer. Ethnol.*, pp. 35, 39, 71, 72, 74, 75.

³ "Tewa Relationship Terms," *American Anthropologist*, N. S., 14 (1912), p. 480.

⁴ It was Dr. Kroeber who suggested to me the derivation.

usage. I first noted it among the terms of relationship exchanged in the rite of "smoking" the *sha'lako*.

The six *a'Doshlē* and their wives, the six *suukē* and theirs all belong to the company of the gods, to the *ko'ko*. They all¹ came from the region of the Sacred Lake, from *ko'luwala*, and back to *ko'luwala* the *a'Doshlē* returned with the other *ko'ko*, thereafter to be impersonated only at Zuñi, but the *suukē* did not return, they took up their residence in the mesas. There, the special function of the *suukē* appears to be the protection of the peach orchards at the base of the mesas against child raiders.² The *suukē* who lives at To'wa ya'lenē is said to throw the sack of a poacher on top of a tree, having emptied the stolen peaches into the basket he himself carries. Formerly the *suukē* were much wilder and carried off the children themselves in their baskets. The *suukē* are personated too at Zuñi, but they appear to be far less conspicuous or interest-inspiring than the *a'Doshlē*. What is said of the *a'Doshlē* applies also, I was told, to the *suukē*, but in my talks with both the children and their seniors it was almost always the *a'Doshlē* who was mentioned.³

The *a'Doshlē* and his wife—I shall speak of them as a single pair for although a couple is attached to each *kiwitsine* no more than one couple ever appears on any occasion—the couple both wear masks. They are white, "spotted" black. (The mask of the *suukē* is black, "spotted" white). The hair falls loose at the sides and over the face of the mask. The hair of the *a'Doshlē* is black, that of his "old woman" white. Both masks have bulging

¹ Of the particularized origin of the *a'Doshlē* or *suukē* there seems to be no account.

² A comparatively modern function, since peaches are a Spanish importation. Adults will steal peaches, too, I am told. From several observations in Zuñi I infer that modern forms of property are far more subject to theft than antique forms.

³ One Americanized, sophisticated woman did not know about the *suukē* at all. Her father did, however; but even after he had spoken of the sometime wild spirits of the mesas his daughter continued to insist to me that the term *suukē* must be Hopi.

Since writing the above I find there is a valid ground for the confusion of my sophisticated Zuñi friend. Dr. Fewkes is similarly confused. Identifying the Soyok Kacinas of Tusayan with the *a'Doshlē* of Zuñi and opining that they are an importation among the Hopi from the eastern pueblos he states that "Atocle at Zuñi is sometimes called Soyok." ("Hopi Kacinas," pp. 71, n.a.). See photograph of the Soyokmana, pl. CVI in *15th Ann. Rep. Bur. Amer. Ethn.* (1893-4).

eyes and long protuberant, tusklike teeth. The *a'doshlě* wears a deer skin around his loins, a "lion" skin over his shoulders, and a coyote skin to hold on his mask, around his neck. His body is spotted white and two snakes are painted in white on his chest. On his feet are the regular blue and orange dance moccasins, and on his right calf the regular tortoise and antelope toes rattle. He carries a large knife, and one of his terrifying gestures is to sweep back the hair from his mask with his knife. He also carries a bow and arrows and some eagle feathers. The "old woman" (personated by a man) wears the regular buckskin leggings, and the old style Zuñi dress, leaving the arms and right shoulder bare. Her mask is attached to a piece of black cloth around her neck. Formerly in place of the cloth were worn rabbit skins. In her hair is an eagle feather dyed red. On her back is a large basket, the conical *huchapone*, and in it a brush of twigs. She too carries eagle feathers, also a crook.¹

The *a'doshlě* and the *suukě* figure in but one² of the dances,³

¹ Since writing this account of the *a'doshlě* I have been again in Zuñi, and on this visit I succeeded in seeing the mask. It was however not the *a'doshlě* proper, but the *mu a'doshlě*, that is the Hopi make-up. My notes for the most part merely supplement the description previously given me. The white mask is a circular affair enclosing completely the head and face, the hair attached only to the crown. The black spots are about the size of a dime. The separately attached eye bulbs are painted in circles of whitish-yellow, red, whitish-yellow, black. I also noted that the lower arms were painted dark brown with black spots; that strands of yucca were tied around the wrists; that two stiff eagle feathers and some downy were bunched in the hair; that the buckskin skirt was fastened by the regulation dance belt with the regulation fox skin at the back; and that instead of an arrow a piece of yucca and a twig of spruce were carried in the left hand. The knife in his right hand was about 18 inches long, a rusty steel blade. Formerly, according to Mrs. Stevenson ("The Zuñi Indians," 23rd Ann. Rep. Bur. Amer. Ethnol., pp. 228, 229, 1901-2), it was a stone knife. The chief departure from my previous account is in regard to the mouth. There were no tusks and the rather inconspicuous mouth was set in the coyote fur collar. I believe that this differentiated mouth is the chief characterization of the *mu a'doshlě*.

On this occasion the old woman *a'doshlě* did not appear.

² Dr. Fewkes describes ("A Few Summer Ceremonials at Zuñi Pueblo," pp. 41-2, Jour. Amer. Ethn. and Archaeology, I (1891)) the Hay-a-ma-she-que dance of July 30, 1890, and in it the appearance of the *Ar-toish-ley*, as he writes the name, "the old scold." Except that her tousled hair is gray and that she is barefoot, her ankles ringed with cedar twigs, her get-up corresponds to the picture I have given of the *a'doshlě's* "old woman" or, rather, if we go by Dr. Fewkes' photograph-drawn cut, representing the mask as black with white spots, of the female companion of the *suukě*.

the *wa'templa*¹ or "All herds," late winter and early spring dances.² The function of this dance or of part of it is referred to as *awek uwanaga*, "wipe the earth" a purifactory ceremonial, I infer from the accounts I got. After the morning dance, the *a'Doshlē* accompanied by his "old woman" and by two or more *ko'yemshi*, those inevitable caretakers of the *ko'ko*, the *a'Doshlē* party sets forth on a

On December 18, 1915, I too saw the *a'Doshlē* dancing with the *hemoshikwe* set of dancers at the conclusion of the *sha'lako* ceremonial. At this time the *wa'templa* dance is performed by the *ohewa kiwitsine*, the *hemoshikwe* dance by the *heiwa kiwitsine*. A member of the Zuñi family group I was visiting being a member of the *ohewa kiwitsine*, undertook to get some one from that *kiwitsine* to represent *a'Doshlē* in the *wa'templa* dance, I to present him with some tobacco. None would volunteer—"the young men don't like to play the part of such a hideous old fellow." The personator who eventually did appear was of the *heiwa kiwitsine*. The part of *a'Doshlē*, I believe, was not new to him. He came out of the *heiwa sha'lako* house and went through the village on the morning of December 16 not appearing again until the morning of December 18 when he danced with his own *kiwitsine* group rather than with the group to whom he theoretically belonged, the *wa'templa*.

³ Of interest is their appearance in two tales reported by Cushing, "The Coyote who killed the Demon Siuiuki and A'tahsaia, the Cannibal Demon." (*Zuñi Folk Tales*, New York, 1901.) The Siuiuki lives on the edge of To'wa Yäl'tone, lying in wait for hunters to eat them up. He is spotted or speckled. He carries a knife. A'tahsaia is also speckled—with scales of black and white and never was he seen without his great flint knife with which he *poked his hair back*, so that it was covered with the blood of those he slaughtered. (A light on the gesture which somewhat to my surprise I found so emphasized.) A'tahsaia's eyes popped out of his head like skinned onions, and out of his enormous mouth stuck crooked yellow fangs. He carried a bow, and over his shoulders he wore whole skins of the mountain lion and the bear. He devoured men and women for his meat and children for his sweetbread. He too lived in a mesa cave.

In Navajo legends big gray gods, cannibals, prey upon children. These gods are now given the rôle of clowns and dunces in the dances. (*An Ethnologic Dictionary of the Navaho Language*, p. 495.)

Have we here as well as in the case of the *a'Doshlē* the beginning of the demotion of a supernatural figure to a nursery status, a Saint Nicholas become Santa Claus?

¹ The picture given by Mrs. Stevenson of this dance ("The Zuñi Indians," pl. LXIX) is a picture not of the real dance, a very reliable Zuñi pointed out to me, but of a burlesque, one of the burlesques the Zuñi are so fond of. Nor is it the function of the *a'Doshlē*, "the angry gods" as Mrs. Stevenson calls them, to make any announcement about the return of the *ko'ko*. Cp. "The Zuñi Indians," p. 140.

The Hopi Cooyoktu Kacinas belong, we may note, to the so-called "Ichiwoti" or Angry Kacinas. (Voth, p. 118.)

² The Hopi Powanu ceremony also occurs at this season. It appears to be a preparatory or purifactory ceremonial. There is a like character to the Zuñi *wa'templa* ceremonial. May it not be that in both ceremonials, the children as well as natural conditions are to be prepared to turn over a new leaf?

round of house-to-house visits lasting until sundown.¹ Any child the party encounters they may chase—one little friend pointed out to me the corral she had once hidden in away from them—but the *a'doshlĚ* is supposed to visit in particular the houses where bad children live. If required, he will continue his rounds a second or a third day, and at any time during the year, if he is sent for, he will come.

Nevertheless, whether sent for or desired by the elders, when the *a'doshlĚ* and his party are seen approaching their house the grown-ups pretend to scare the visitors away. They beat drums and tin pans and even take to guns, one informant added. Three times the *a'doshlĚ* and his cortège advance upon the house and three times they retreat. On their fourth approach they are let in, just as we might expect, knowing how obsessive of the Zuñi mind is the numeral four. Inside, in a slow, high-pitched voice, loud enough to be heard all over the village, all proceed to berate and lecture the terrified and often wailing children. The children who have not yet been initiated, children under seven or eight, are terribly frightened and even the older children may be upset.² "You must not mock your parents," all are instructed, "you must mind your mother." "You must not soil the floor after it has been swept up." A boy is told he must learn to look after the horses, a girl that she must look after the baby, she must learn to cook and to grind. And then the "old woman" may catch the little girl's ankles in her crook and drag her over to the grinding stone, pretending to be about to grind her up. Throwing his hair back from over his mask with his knife, the *a'doshlĚ* himself may threaten to cut off the

¹ Mrs. Stevenson describes such a round of visits taking place before *sha'lako*, i. e., in late November or early December. (*The Zuñi Indians*, p. 229.) In 1915 the *a'doshlĚ* did not "come out" at this time. During the last week of January, 1916, he was "out" twice.

² But the skeptical spirit grows. My little twelve-year-old friend showed me the house where she knew the man who played *a'doshlĚ* lived. It was the same house he came out of, by the way, when I saw him on a later visit. An older "informant" told me that even in her childhood when the *a'doshlĚ* was sent for because the girls would disobey and ride wild on the burros, her playmates said to one another that the *a'doshlĚ* didn't really know what they were up to, they knew only what they had been told by parents.

children's ears. If a boy has rebelled against having the lice taken out of his hair by his mother, the "old woman" will apply her brush and the *a'Doshlē* will pretend to eat the lice brushed to the ground. If it is cleaning his face a boy has neglected, the *ko'yemshi* may take him down to the river and, cutting a hole in the ice, wash his face for him or, if so minded, souse him altogether¹ that he may not forget in the future to wash his face early every morning in the river as all well-behaved Zuñi lads are expected to do. From his *ko'yemshi* captors the boy knows very well he cannot run away—to keep the children from running away is one of the reasons the *ko'yemshi* accompany the *a'Doshlē*.

But a child may himself be carried away—there is always that standing threat—carried off in the old woman's basket, carried off to *ko'tuwala* to be eaten up. In the ancient days children were indeed carried off there, old as well as young believe.² At present the act of cannibalism is in pantomime. Perhaps the *a'Doshlē* will pretend to take a bite out of the neck of some adult in the family.³

In connection with this ceremonial or buffoon cannibalism, we may note that the *suukē* is referred to as more voracious than his *a'Doshlē* counterpart. He eats things whole. He would swallow a child in one gulp. He also eats "whatever is dry," dry bread, dry meat, etc. According to one informant, whenever a child was particularly refractory it was this devourer who was sent for.

Not only in the cannibal make-believe do the adults in the household lend themselves to the devices of the *a'Doshlē*: they help in the "talking to" he administers the children by asking him to lecture the older ones too. The better to convince the children, a woman would complain to the *a'Doshlē* that one of the men in the family was lazy, that he failed to go to the fields or to bring in the

¹ Cp. Stevenson, p. 229.

² Evidence of child sacrifice is not wanting in Zuñi. It figures in several traditions. It is said to have figured in one of the ceremonials within the past century. The bewitching of people through their children, perhaps even the practice of dedicating the sick to fraternities, also form complexes of associated ideas and feelings. I hope to give the whole subject further study.

³ But only a few weeks before my visit, I was told, the *a'Doshlē* really did bite a child in the neck.

wood.¹ Then, when it is time for the *a'doshlě* to leave, the elders give them presents of bread and meat, presents the attendant *ko'yemshi* take in charge. The elders also sprinkle on the heads of all, upon *ko'yemshi* as well as upon the *a'doshlě* pair, the sacred meal.²

In the one domiciliary visitation I have witnessed since writing the foregoing several of the features were observed and several omitted. Owing to the special circumstances of the case (see p. 341, ft. 2) the *a'doshlě* was unaccompanied by his "old woman" or by the *ko'yemshi*. He ran up against the house door twice only, striking it with his knife. In the house were three children, a baby asleep, a boy of three, a girl of four, and six adults. All but the infant and one man who was probably a visitor took part in the

¹ Mrs. Stevenson describes the complaint of adult against adult as made in earnest. (*The Zuñi Indians*, p. 229.)

² A comparison with Voth's account of the domiciliary visitations of the Oraibi Cooyoktu will be of interest. Of these Cooyoktu "there are generally four: The Cooyoktu Pawaamu (elder brother of the Cooyokos) the Coooyoktu Tahaamu (uncle, mother's side, of which there are two) and the Cooyok Wuhti (woman). These are accompanied by two Hehea Kacinas.

"These Cooyoktu are very much dreaded by the children of the village. When a child is naughty or disobedient, the parents or relatives threaten that they will recall these monsters, who will come and get it. On these occasions, when the latter are in the village, these threats are often carried out, and the conversation that occurs when they come to a house where a child is to be frightened into good behavior is usually about as follows: The Cooyoktu, Pawaamu approaches the child and says: 'You are naughty and bad, we have come to get you. You fight the other children, kill chickens (or other similar misdeeds are mentioned), and we shall now take you away and roast and eat you.' The Cooyok Wuhti chimes in and repeats the charges and the threats. The child begins to cry and to promise good behavior, but the Kacinas refuse to relent. 'Of course, you will be bad again, we do not believe you,' and the woman begins to reach after the child with her crook. The latter screams and begins to offer presents, usually meat if it is a boy, sweet corn-meal if it is a girl. The Pawaamu pretends to take the present but grabs the child's arm instead. The pleadings and promises to be better are renewed and finally the two Kacinas say that if the two Tahaamu are willing to accept the presents, they will relent this time. The latter declare themselves satisfied, the meat is put into the *hoapu* (basket) carried by the woman, the meal into sacks carried by the two Hehea Kacinas, and with many admonitions and threats to certainly take the little sinners if they hear of further complaints, the party moves on to another place, where the same scene is repeated. The Hopi say that formerly the Kacinas would occasionally actually take a child with them, but that once a child died from fright, and since then they content themselves with frightening the children as described." (*The Oraibi Pawaamu Ceremony*, p. 118.)

performance. The *a'doshlē* proceeded to harangue the little boy, punctuating his sentences with thrusts at the child with his knife. The boy stood at a woman's side, but although he showed great fear in his eyes and in his tense little body he did not flinch as he answered *æ*, "yes," to each injunction. It was as self-restrained and as brave a little act as one might see. At the close of the *a'doshlē* harangue to the boy, the male head of the household took the little fellow out of doors and had him wash his face and hands in the snow. Meanwhile the girl covered her eyes with her hands and hid her head in the lap of the woman to whom she clung. When the *a'doshlē* approached her, the old woman made her look at him and answer despite her whimpering. All but the man visitor gathered in a circle, the *a'doshlē* a part of it, with his back to the center, *i. e.*, his back to the others. All prayed, and then beginning with the male household head sprinkled the head of the *a'doshlē* with meal. The little girl, but not the little boy, was lifted up to sprinkle him; a woman gave him a covered bundle which looked like rolls of bread¹ and he left the house.

In going through the village—before paying the visit I have described he went to the *ko'yemshi sha'lako* house to dance²—he would call out in his high-pitched voice and sweep back his long black locks with his knife. He would also stand still for a moment or two to make a sudden little run forward. Not only the children, but the older girls, girls of sixteen or eighteen, ran away from him or withdrew quickly indoors. I saw an old woman with a bevy of children and young women shutting themselves up in an outhouse as he approached.

In conclusion, one more function of the *a'doshlē* is to be noted. Sometimes he visits the adult in earnest as a kind of sergeant-at-arms. When a man fails to turn up in time at a fraternity gathering the *a'doshlē* is sent for him. In one case I heard of, for example,

¹ They usually give him meat, I was told.

² I followed him in. After dancing and calling out a few minutes he took off his mask. He was a middle-aged man. I noticed two or three boys watching him through the windows of this house. They must have recognized him of course. No attention was paid to me in either house, but I was not regarded as an intruder since I had been asked by one of my go-betweens what I wanted to see the *a'doshlē* do.

during one of the dances in which a member is supposed not to sleep the night out at home, my friend, prolonging in his house an early evening doze, was awakened by the even to him uncanny voice of the *a'DoshlĚ* bidding him go to the assemblage where he was due, and straightway he went. "No man says 'no' to the *a'DoshlĚ*."

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SOCIOLOGICAL TERMINOLOGY IN ETHNOLOGY¹

By A. A. GOLDENWEISER

IN statistics it is often dangerous and always absurd to express one's conclusions in terms more accurate than is warranted by the variability of the material. Wherever terminological questions arise, a similar difficulty confronts us. Terms less precise than the data hamper understanding, terms more precise than the data are misleading. Classical anthropology prided itself on the definiteness of its terminology. The progress in ethnographic knowledge and in theoretical ethnological thinking has, on the whole, gone hand in hand with decreasing definiteness in terminology.

In the field of sociological concepts, Lewis H. Morgan is perhaps the best representative of the classical school. We find him using the terms gens, phratry, tribe, confederacy, with strictly definite connotations. In his scheme, born of his knowledge of Iroquois society, a gens is characterized by ten functions, each of which must be regarded as symptomatic of a gens: the right of electing its sachem and chiefs; the right of deposing its sachem and chiefs; the obligation not to marry in the gens; mutual rights of inheritance of the property of deceased members; reciprocal obligations of help, defense, and redress of injuries; the right of bestowing names upon its members; the right of adopting strangers into the gens; common religious rites; a common burial place; and a council of the gens.

In a similar way he defines the phratry, the tribe, the confederacy. To define a social unit by its functions is, in principle, an admirable procedure. The function constitutes the very essence of a social unit, it denotes what the social unit stands for in the culture of a group; to define social units by their functions would thus be scientifically the most desirable solution of the terminological

¹ Read before the American Anthropological Association at Philadelphia, 1914.

problem, provided the different social units were found to exercise different functions or groups of functions. Morgan supposed this to be the case, but data since accumulated make his position untenable. The functions of social units vary and overlap. Equivalent social units exercise in different tribes different functions; different social units assume in different tribes similar or identical functions. Thus the Iroquois clan shares with the Haida town and the Blackfoot local group the right to elect its chief; it shares the obligation not to marry in the clan with the Tlingit and Haida phratries; the right of inheritance of the property of deceased members is, in other groups, the prerogative of individual families or it may be a purely individual matter, or property and prerogatives may be passed on as a dowry from a man to his daughter to be held or exercised by her son (as is the case among the Kwakiutl); common religious rites are exercised, in different groups, by individual families, maternal families, tribes, religious societies; councils, finally, may be held by members or representatives of families, maternal families, local groups, phratries, tribes, confederacies. Thus the clan shares its functions, as enumerated by Morgan, with many other social, political, and ceremonial units. On the other hand, the functions of clans (or gentes) vary as we pass from one tribe (or group of tribes) to another. The Iroquois clan is a political unit, it practises exogamy, is vaguely associated with locality and ownership of land (particularly cemeteries), but has no ceremonial functions; not indeed in the sense that there are no clan ceremonies—witness to the contrary clan adoption ceremonies, clan mourning ceremonies, etc.—but in the sense that on ceremonial occasions, when many clans participate, the clan is not a ceremonial unit. On the Northwest coast, on the other hand, the clan has no political functions, it is exogamous only in a derivative sense (the phratry being the exogamous unit), but its ceremonial functions are all important and are associated with clan ownership of material and spiritual goods: masks, carvings, ceremonial paraphernalia, but also myths, songs, dances, magical devices. The gens of the Omaha, finally, exercises both political and ceremonial functions. Again, functions which must needs be designated by one term, such

as exogamy, may yet, in particular instances, have special connotations. The Iroquois clan, for the last two hundred years or so, has been an exogamous unit in its own right. The clan of the Tlingit and Haida is exogamous as part of a larger social unit, the phratry. The clan of the Hopi or Zuñi, while exogamous in its own right, is a very different group numerically from the Iroquois clan. In one case we deal with social units of which the tribe contains fifty or more and which must needs be very small groups; in the other, the strictly limited number of clans goes with a much larger number of individuals in each clan. That the concrete setting of exogamy as a function of the clan cannot be the same in the two instances, is fairly obvious.¹ The phratry and dual division are no less variable in their functional aspects. The same applies to the individual family, the maternal and paternal family, and the local group, all of which, for instance, together with the phratry, dual division, clan and gens, may exercise ceremonial or political functions, or both.

Thus while we realize more firmly than ever that a social unit is what it does, that the function is the very essence of a social unit, we may no longer attempt to define a social unit by its functions, for a terminology thus constituted would, in view of the prevailing overlapping of functions, make confusion worse confounded.

The question arises: should the terms currently used for the designation of social units be done away with altogether? If a clan is one thing here, another there; if a phratry changes with tribe or culture area; if, moreover, what is characteristic of a clan here, is a phratry trait there, and still elsewhere that of a maternal or individual family, or of a local group, why use the terms clan, phratry, etc. at all? Why not reject these confusing remnants of an overconfident period in anthropological thinking and, moulding our terms after the nature of our data, use either descriptive terms,

¹ For a more detailed treatment of exogamy see the section on "Exogamy and Endogamy" in my "Totemism, an Analytical Study," *Journal of American Folk-Lore*, Vol. XXIII, 1910, pp. 231-251, Dr. R. H. Lowie's "A New Conception of Totemism," *American Anthropologist*, New Series, Vol. XIII, 1911, pp. 192-198, and my "Exogamy and Totemism defined: A Rejoinder," *ibid.*, New Series, Vol. XIII, 1911, pp. 589-592.

such as the specific occasions may suggest, or native terms with the precise native connotations in each particular instance? The first alternative, namely the use of non-technical descriptive terms, would, if adopted, dangerously increase the size and cost of our monographs; moreover, it would necessitate the discontinuance of the use of such non-technical terms with loose and varying connotations; a condition hardly realizable in practice. The alternative adoption of native terminologies, on the other hand, would make treatises on social organization as esoteric as are those on symbolic logic. But there is a more serious reason for preserving the classical terminology while redefining it. The social units designated by the classical terms, as well as the individual family, the maternal and paternal family, and the local group, constitute what one may call natural groups. An illustration will make this clear.

A religious or military society may share a function or functions with a clan or phratry, but the two kinds of social units remain, nevertheless, radically distinct owing to the nature of their social composition. A religious or military society is constituted a social unit by the exercise of its functions; there is no other bond between its members than that of their functional solidarity. A village group, on the other hand, or a clan, or a maternal family, while also determined in their social bearings by their functions, display, in addition, a solidarity of a different order, founded on their social composition as territorial or kinship groups. Of such natural groups three types are distinguishable: the *biological*, the *pseudo-biological*, and the *territorial*.

To the *biological type* belong the individual family, the maternal, and the paternal family. A married couple with their immediate ancestors and progeny constitute a biological unit. This is the nucleus of an individual family, while the household may often include, in addition, the wives and husbands of the younger members of the family. A group of blood-relatives with the additional feature of unilateral descent, constitutes a maternal family (maternal reckoning), or a paternal family (paternal reckoning). The *pseudo-biological type* is represented by the clan and the gens.

A clan or a gens is a group of blood and fictitious relatives, hereditary in the maternal (clan) or paternal (gens) line. In the psychological setting of the clan (or gens) the group of blood relatives is merged in the wider group of fictitious kindred, often bound by the ties of remote (usually mythological) descent from a common ancestor. The phratry, in so far as it is a subdivided clan (or gens) or an association of clans (or gentes) is a derivative of the clan (or gens). The *territorial type* is represented by the different varieties of local groups, beginning with the primitive group occupying a loosely circumscribed district and ending with a village.

In such groups, biological, pseudo-biological, and territorial, man has always lived and still continues to live; for their basic principles are given in the very nature of the relation of the human group to its physical environment and to its own propagation. In the most primitive conditions the territorial or local group is universal. It has long ago been pointed out by Cunow and Starcke, but is not even now sufficiently recognized, that the clan as a definite and hereditary social unit could not possibly have constituted the most ancient form of social grouping. Even if we grant, for a moment, that the individual family was, in the primitive state, unimportant or non-existent, the so-called "clan" could, at that period, have been nothing but a vaguely circumscribed and non-hereditary local horde, a very different thing indeed from what in later stages of social development appears as a clan, a hereditary social unit, independent of locality, which must be a social subdivision of a tribe, for its very existence as a clan depends on and presupposes the existence of other equivalent social units. In later stages of culture the local group persists. Thus, in North America, a vast district is inhabited by tribes such as the Eskimo, Salish, Athapascan, the tribes of California, and others, who lack clan or gentile systems, but are organized on the basis of the individual family and the local group. Descent in these tribes is indeterminate, the maternal as well as the paternal line being considered in group membership, a condition approaching that found among ourselves. It may be noted that on the North American continent tribes thus organized are, on the whole, more primi-

tive in the other aspects of their cultures than are the tribes organized on the clan and gentile basis. In the tribes of the latter type, again, such as the Iroquois or the Northwest Coast tribes, or the tribes of the Southwest, Southeast, and the Eastern Plains, the local group coexists with the hereditary social units and continues to exercise various functions such as communal ownership of land, communal work, coöperation in minor things of daily life, and so on. At a still later period represented by the tribes found at the dawn of the historical period in Europe, Africa, and Asia, the clan organization, where it has existed, breaks up finally to give room to the village and the town as the henceforth fundamental units of social coëxistence. The tendency of much anthropological and sociological writing has been to underestimate the importance of locality in primitive social organization. In the light of much new evidence, we must now rehabilitate this most ancient and practically universal form of social grouping and give it its due.

Next to the local group, the individual family must be recognized as a social form of probably universal distribution. We may not at this place reproduce the arguments for the existence of the individual family in most primitive conditions. Suffice it to say that psychological and zoölogical considerations make it in the highest degree improbable that in most primitive society the family should have been completely absorbed in the horde. Nor has the hypothesis of promiscuity, referring to the primitive horde, ever been satisfactorily demonstrated. Group marriage, while certainly representing an actual form of the matrimonial relation, is much more plausibly and satisfactorily explained as a specialized development from individual marriage, than as a pristine form antecedent to individual unions.¹ Moreover, while polyandrous and polygynous practices represent a common phenomenon in many times and places, monogamous unions, not necessarily of great permanence, represent the more common form even in polyandrous and polygynous communities.²

¹ Cf. W. Wundt's ingenious hypothesis in *Elemente der Völkerpsychologie*, pp. 165-173.

² Credit must be given to E. Westermarck for a clear realization of this fact.

In tribes of the family-village type, to which, as stated before, a large number of North American tribes belong, the individual family shares with the local group all the important social functions, in so far as they are not exercised by single individuals. In tribes of the clan and gentile type, on the other hand, especially when combined with exogamy—which is usually the case—the solidarity of the individual family is materially impaired; nevertheless it continues to play a not inconspicuous part in home life, especially in the grouping of inmates of houses as well as the more intimate control of individual behavior; nor is it scarcely ever completely deprived of functions of social and ceremonial import. In later stages, with the breaking up of the hereditary kinship groups, the family again becomes an all-important unit, in some respects second in importance only to the local group, in other respects of equal or even greater importance than the latter.

It will be seen from the preceding remarks that the clan and the gens cannot compare in antiquity or universality with either the local group or the individual family. They are foreign to most primitive society, nor do they persist under the socio-economic conditions ushered in with the historic era. Both, nevertheless, present widely diffused and highly typical forms of primitive social organization. It becomes indeed probable, with the constant accumulation of relevant data, that the social, religious, and intellectual manifestations of primitive life which strike us as most divergent from our own, are in part at least conditioned by that peculiar social setting, so foreign to our own culture.¹

Within the clan and the gens we sometimes discover another social formation which has so far been little described or understood. It belongs to the biological type with unilateral descent, and we designate it as the maternal or the paternal family. This form of social unit has, in fact, been carefully studied only in the case of the Five Nation Iroquois, described by Morgan and, since his time, by other investigators. Among the Iroquois all the immediate descendants, male and female, of a woman, the immediate descendants

¹ See my remarks in "The Social Organization of the Indians of North America," *Journal of American Folk-Lore*, Vol. XXVII, 1914, pp. 434-436.

of her female descendants, etc., constitute a maternal family. While theoretically there is no limit to the series, the practical extension of a maternal family seldom goes beyond the fifth or sixth generation. A comparison of a maternal family with a clan discloses a set of equally striking similarities and differences. Like the clan, the maternal family is a hereditary social unit based on maternal descent, but whereas in the clan the kinship is at least in part fictitious, the members of a maternal family are blood relatives. The clan is always designated by a name, the maternal family has no name. The clan, finally, sustains no loss of members who by descent belong to it, for by means of the clan name, membership is automatically sustained from generation to generation. The maternal family, on the other hand, constantly tends to break up. There being no external symbol of family membership and solidarity, memory must take its place, and memory weakens as the generations pass by. Thus a maternal family is always surrounded by a fringe of individuals who are known to be related to it by blood but the degree of whose relationship is no longer remembered. An objective genealogical reconstruction, moreover, would often disclose still another fringe of individuals related by blood to the family even the fact itself of whose relationship remains unknown. The maternal family played a most important part in Iroquois society. While the fifty chiefs of the Iroquois confederacy referred to particular clans they were really hereditary and elective within the limits of maternal families which, with few exceptions, constituted but a part of the clan. The initiative in appointing a candidate for a vacant chieftainship and in deposing a chief whose competence was deemed insufficient, lay with the matron or head woman of his maternal family. In all social, ceremonial and in part religious and military matters the maternal family was the unit of greatest solidarity. That the importance of the maternal family should prove to be a unique Iroquoian phenomenon can hardly be expected;¹ and further research on the American continent and elsewhere will probably lead to a definite inclusion of this

¹ Dr. R. H. Lowie informs me that according to his field notes the so-called "clans" of one at least of the Hopi villages, Walpi, prove to be maternal families.

natural social unit with the other units so far discovered in primitive society.

Brief definitions for the natural units here described may now be formulated.

A *band* is a local group without very clearly defined functions.

A *sept* is a local group which is a subdivision of a larger local group or a local subdivision of a social unit.

A *village* is a local group of fairly definite internal organization and external functions.

A *family* or *individual family* requires no further definition.

A *maternal family* is constituted by a woman, all her immediate descendants, female and male, the immediate descendants of her female descendants, etc. A maternal family, however, never extends, in its entirety, beyond five or at most six generations.

A *paternal family*¹ is constituted by a man, all his immediate descendants, male and female, the immediate descendants of his male descendants, etc. The remark made about the maternal family applies here also.

A *clan* is a subdivision of a tribe constituted by a group of actual and assumed kindred, which has a name and is hereditary in the maternal line.

A *gens* is the same except that it is hereditary in the paternal line.

A *phratry* is a social subdivision of a tribe which is itself further subdivided.

A *dual division* or *moiety* requires no further definition.²

To supplement these terms, descriptive terms will have to be used such as occasion may require.

I should not like to convey the impression that the above definitions are proposed in the assurance that the difficulties referred to

¹ The concept "paternal family" must, for the present, remain an academic one. There is some ground for believing that a grouping of that type, only less fixed than among the Iroquois, existed among the Omaha and some of the Salish tribes of the interior of British Columbia.

² This set of terms and definitions is practically identical with the one submitted in the *Journal of American Folklore*, Vol. XXVII, 1914, p. 434, in the article referred to before.

in the opening paragraphs will thus be overcome; these difficulties reach deeper than terminology, being grounded in the complexity of the data, hence, no terminology can be perfectly satisfactory, in all cases. If, however, the choice is presented between no terminology and an imperfect one, the latter alternative seems the lesser evil, and as such the above terms are here proposed.

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PRELIMINARY REMARKS ON THE ARCHEOLOGY AND PHYSICAL ANTHROPOLOGY OF TENERIFE¹

By E. A. HOOTON

IN the course of the past summer an archeological study of the Canary islands was begun in the interest of the African Department of the Peabody Museum. This is in connection with a plan for a comprehensive survey of North Africa to be carried out by the Department under the direction of Mr. Oric Bates. The results of these explorations are to be published in annual volumes. Last summer the work was confined to Tenerife and it is hoped that it will be continued in the other islands of the Canary group next season.

The racial, linguistic, and cultural affinities of the aboriginal inhabitants of the Canary islands have not, as yet, been conclusively established. In recent years no archeological excavation has been carried on in the archipelago by any accredited person. Dr. René Verneau, between 1877 and 1883, spent some years in the islands and collected many objects of the ancient industry and much skeletal material. In none of his published works, however, does Dr. Verneau give a detailed record of the excavation of any archeological site, nor does there exist, so far as I know, reliable information as to the presence or absence of stratification of cultures in the Canaries.

Five problems of general importance may be propounded for brief discussion. I propose to deal with these mainly in the light of one season's work in Tenerife.

I. WHAT IS THE ARCHEOLOGICAL EVIDENCE OF MAN'S ANTIQUITY IN THE CANARY ISLANDS?

Stratigraphic Evidence.—No stratified archeological site has ever been recorded in the Canary islands. In Tenerife caves are

¹ Read before the American Anthropological Association at Washington, D. C., 1915.

the only archeological sites. I have excavated several relatively unimportant caves in Tenerife and have found in them no evidence of human occupation below the surface. Climatic conditions in the islands are such that human remains exposed to the air in caves are remarkably well preserved. Bones are much harder and less dry and brittle than Egyptian remains of predynastic date. They are never fossilized. It may be assumed that human remains from the aboriginal burial caves are not much later than the end of the fifteenth century A. D., by which time the conquest of the islands was completed. There is nothing to indicate any great antiquity for any of the cave remains.

Geological and Paleontological Evidence.—The Canary islands are a volcanic group of comparatively recent origin surrounded by very deep water. The original volcanic disturbances which resulted in their formation began not earlier than the Upper Miocene and the elevation of the group continued down to the recent period. There is no evidence for the supposition that the Canaries were ever a part of the mainland of Africa. They could scarcely have been colonized by land in paleolithic times even during a period of great elevation. No remains of Pleistocene mammals have ever been found in the archipelago. Indeed there is good reason for believing that large animals were introduced in a state of domestication by the early settlers. In short, it seems impossible that the islands were inhabited before the beginning of the present geological epoch.

Typological Evidence.—The material arts of the ancient Canarians show certain analogies with neolithic European cultures. The natives, at the time of our first knowledge of them, were mainly pastoral peoples who had large flocks of goats and subsisted chiefly on their produce. They also grew barley, fished, and made pottery without the aid of the wheel.

The literary evidence in regard to their knowledge of navigation is conflicting. It seems probable that there was very little communication between the islands in the period immediately preceding the conquest. However geological reasons make it imperative to assume a knowledge of navigation on the part of the first colonizers.

Stone working in the Canaries was never brought to a stage of advanced technique because of the scarcity of suitable material. In Tenerife the Guanches never had polished stone implements although they made lava mills by grinding and pecking. Verneau and others have compared their rudely chipped obsidian and basalt implements with the Mousterian and Acheulean paleolithic flint industries. There exists no real analogy between aboriginal Canarian stone chipping and the paleolithic work except, as is natural, that both have implements rudely chipped, either on one side only, or on both sides.

On the other hand four polished chloromelanite celts have been found in Gran Canaria and one in Gomera. These may have been brought in from Europe.

It should be pointed out that the Guanches did not have a "paleolithic" culture. They were not hunters like the Crô-Magnon race with whom they have been identified. They had no spear throwers, nor did they paint on cavern walls and engrave on bone. The only resemblance between the two cultures lies in the use of skins as clothing and caves as dwelling places.

The conclusion of the first question is that the Canaries were colonized during the recent period and that the settlers came by sea, probably bringing with them their domesticated animals.

II. WAS THERE A DIVERSITY OF CULTURES IN THE DIFFERENT ISLANDS IN PRE-CONQUEST TIMES?

The manner of life in all of the islands seems to have been much the same. The staple food was *gofio*,—toasted grain mixed with water, milk, or honey. Barley was the only cereal cultivated, goat-herding the principal industry, and goatskin garments of similar patterns were worn throughout the islands. Weapons and warfare were almost identical, but social organization and custom differed in some respects in the various islands.

The ancient Canarians lived for the most part in caves, usually natural, but sometimes artificial. In Tenerife the cave seems to have been the only aboriginal dwelling place, but in Grand Canary and in several of the other islands, well-constructed circular houses

of stone with conical thatched roofs were built by the natives and several of them still exist.

One of the best defined industrial differences in the islands lies in the pottery. In Tenerife there are a few simple conical forms of badly baked clay, bearing scanty incised ornament or no ornament at all. In La Palma most of the ware is bowl-shaped and elaborately ornamented with incised lines, punched and stamped patterns. The Fuerteventura ware is again quite different in form and has its own characteristic ornament of incised meanders and festoons. In Gran Canaria the pottery types are much more varied than in the other islands; most of the vessels are provided with handles, spouts, and lids; some of the ware is red-faced and ornamented with painted designs. The ware here is much better baked than other Canarian pottery, and it is particularly to be remarked that several sharp angled forms are unquestionably imitations of stone or metal vessel forms, although no metals were used by the ancient Canarians. The use of pottery stamps or *pintaderas* for coloring the body, seems to have been confined to Gran Canaria.

The Guanches of Tenerife elaborately embalmed their upper class dead and it is probable that with minor differences the same rites were practised also in the rest of the islands.

On the basis of evidence presented in part above, it seems probable that the eastern islands; Gran Canaria, and probably Lanzarote and Fuerteventura, were secondarily influenced by a more advanced culture than that of Tenerife and the western islands of the group. Most of the local differences in the western islands can be explained by isolation. Unquestionably the eastern islands were in occasional contact with the mainland through raiders, traders, or colonizers long before the conquest and probably in pre-Roman times.

III. WHAT ARE THE ETHNOLOGICAL AFFINITIES OF ABORIGINAL CANARIAN CULTURE?

The answer to this query is yet to be sought. It seems probable that Canarian culture was in the main an outlying development of

the Berber. Unfortunately the Berber tribes of the Atlas region are, as yet, very little known, and the archeology of southern Morocco is practically unknown. A comparative study of the arts, industries, social organization, and religion of the two districts should definitely settle this problem.

The possibility of proto-historic Phoenician or Carthaginian influence upon the culture of the ancient Canarians is one that must not be overlooked as literary evidence seems to point rather definitely to some such contact. The art of embalming practised by the Guanches was probably of African origin and should be traced. Tenerife mummies are not natural mummies such as are found in Peru and Southwestern United States. Embalming was a profession practised by a separate social class.

IV. WHAT RACIAL AFFINITIES MAY BE DEDUCED FROM A STUDY OF THE SKELETAL MATERIAL?

In spite of the large quantity of skeletal material which has found its way to Europe from Canarian caves the osteology of the aboriginal inhabitants has not been adequately studied. Dr. Gregorio Chil studied about 130 skulls. Dr. Verneau measured 350 skulls, but several of the islands are unrepresented in his collection. Von Luschan has reported upon 52 crania of unknown provenance brought back from the Canaries by Meyer. These are the more important studies. I have been able to measure and describe over 350 skulls of known provenance from Tenerife alone and feel that the series is adequate for a definitive study of the craniology of that island.

Verneau and Von Luschan both admit that the population of the Canary islands was mixed before the arrival of Europeans. It is generally agreed that the earlier stratum in the population, called Guanches, was found in greatest numbers in Tenerife.

Hamy was the first to notice in several Tenerife skulls of a Paris collection a resemblance to the cranial type of the tall race of Crô-Magnon which inhabited the caves of southern France in the upper paleolithic. This idea was seized upon by Quatrefages and Broca, and later was elaborated and confirmed by their pupil

Verneau. Other craniologists have accepted this view, without, it seems, a sufficient examination of the facts.

The Crô-Magnon cranial type is characterized primarily by a capacious cubical capacity, a pentagonoid dolichocephalic head-form, combined with a very short, broad face, and low, wide orbits. The stature of the Crô-Magnon race was very high, averaging for males over 1.78 m.

Among Guanche skulls from Tenerife there are some dolichocephalic crania with wide, short faces, thus exhibiting a disharmony of features analogous to that of the Crô-Magnon type. It does not seem however that this common occurrence of disharmonic features is sufficient to warrant an identification of the Crô-Magnon race with the Guanches. Such a disharmonic type may be observed wherever a long-headed, long-faced race is crossed with a round-headed, short-faced race, and we know that such an intermixture between dolichocephals and brachycephals has taken place in these islands.

Verneau assumed without adequate basis that his Guanche-Crô-Magnon type was one of tall stature. In Tenerife he found that the stature of the inhabitants, calculated according to Topinard's tables based on long bones, averaged 1.69 m. for males and 1.52 for females. Of the men 48.3 per cent. were over 1.70 m. in stature, but there is nothing to indicate that these were the individuals with crania of the Crô-Magnon type. Indeed in the majority of the crania that I have examined in Tenerife, the disharmonic features in question are found in small skulls whose owners must have been men of short stature. My own investigations as to the stature of the Guanches have been confined, up to now, to the measurement of a mixed lot of long bones taken from a disturbed cave in the north of the island. Measurement of 63 femora and 71 tibiae yielded according to Pearson's formulae an average height of 1.64 m. for males and 1.52 m. for females. The number of males exceeding 1.70 m. in height was negligible. The maximum height, 1.763 m., was calculated on the basis of a tibia, and it is unquestionably an over-estimate as the femora seem to have been disproportionately short, (femoro-tibial index averaging 83.29 for males).

According to early Spanish writers and other ancient sources, many of the aboriginal inhabitants of the Canaries had fair complexions, light hair, and blue eyes, while others were brunettes. Verneau, with little reason, has attached this light complexion to his Guanche or so-called Crô-Magnon type. He alleges that modern Canarians who are blondes usually exhibit the same disharmonic head-form and tall stature which characterized the Crô-Magnon race. Personal observation of the modern inhabitants inclines me to dispute this allegation. Medium and light complexions are found regardless of facial form or stature. Undoubtedly blondes existed here in early times, but there is no evidence that permits us to connect them with the Crô-Magnon type. The genuine Crô-Magnon people of France in their alveolar prognathism and in the proportions of their limbs, especially the excessive tibial length, show negroid affinities. This seems also to be the case with many Guanches, but this is not an argument in favor of their having had light complexions.

The majority of Tenerife skulls are not of the so-called Crô-Magnon type. Usually they are, without doubt, the skulls of members of the Mediterranean race and in many instances they could not be distinguished from Nordic skulls. Practically the only difference between a Nordic and a Mediterranean skull lies in the greater size, weight, and ruggedness of muscular markings of the former. Judging from skulls of which the associated long bones are lost I should say that the really tall Guanches in cranial form approximate most closely to the Nordic race.

The cradle of the Nordic race is still in doubt. Sergi and Ripley believe that the blonde northerners came from Africa. Certainly there is abundant evidence for the existence of blondes among the Berbers of Northwestern Africa and especially in the Atlas region. Assuming that the historical tradition of the presence of blondes among the Guanches is correct, it is probable that Bertholot is correct in his contestation of their Berber origin.

Unquestionably there was present in the pre-conquest population of the Canary islands a brachycephalic element which was most strongly represented in Gomera. Verneau found it, and

Von Luschan identified it as Armenoid. Von Luschan however based this opinion on four skulls only. Among 50 skulls from Gomera that I have studied, are many which recall the Alpine type, but I consider this series too short to be conclusive and need further data before committing myself to any opinion. The brachycephalic element seems represented very slightly in Tenerife.

As yet the craniological data collected last summer in Tenerife has not been completely worked out. But it may be stated with certainty that Mediterranean skulls are predominant, that secondarily there is found a much larger-sized dolichocephalic type of skull which approaches the Nordic, and thirdly there is evidence of a mixed type resulting from the crosses of the above dolichocephalic types with a primary brachycephalic type. This often results in the peculiar disharmonic skull which has been called *Crô-Magnon*.

V. WHAT IS THE BEARING OF THE LINGUISTIC EVIDENCE ON THESE PROBLEMS?

The scanty remains of the ancient Canarian languages require further investigation by a competent philologist. It seems probable that the inhabitants of the various islands spoke different dialects derived from a common mother tongue. Bertholot considers that these dialects are all varieties of Berber. According to Galindo and Viera, the best of the early authorities, the dialects of Gomera and Hierro were identical, as were those of Fuerteventura and Lanzarote. Canarian words especially recall the language of the *Schluh*, a Berber tribe of the Atlas. There are also some analogies with Kabyle, and a few Arab words are found.

GENERAL CONCLUSION.

In order to settle the archeological and anthropological problems connected with Canarian culture it is essential that a careful survey of the islands be made and all remaining data recorded minutely. This done, it will be necessary to study the archeology, physical anthropology, and modern ethnography of Morocco. I am convinced that the solution of Canarian problems must be sought on the mainland.

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THE OCTOPUS MOTIVE IN ANCIENT CHIRIQUIAN ART

By GEORGE GRANT MACCURDY

THE ancient art of the one small province of Chiriqui in the diminutive republic of Panama is perhaps better known than that of any region of like size in the New World. The material for study is abundant, consisting largely of ceramic products, both painted and unpainted. These have become more or less familiar to students of archeology through two large monographs, one by Professor W. H. Holmes¹ and the other by myself.²

It was found that the pottery could be readily divided into about a dozen rather distinct groups, depending largely on the nature of the paste and other materials used as well as the method of producing the dominant decorative features. For example, symbolism and ornament in the unpainted ware find expression in plastic forms and incised patterns. Both are traceable to zoöomorphic originals, as are the plastic and painted motives in the painted ware. The motive may represent the entire animal in fairly realistic fashion or it may consist of almost any part of the animal; as for example the head, foot, tail, eye, appendage, or some characteristic body marking. Certain animal motives are always represented in the round or in relief; others appear only as incised patterns and still others predominantly as painted forms.

Thus we find the plastic armadillo dominating the great group which might appropriately bear that name; the incised serpent goes with a distinctive group of black ware; the plastic fish in the guise of tripod supports runs through another group; while the painted alligator is supreme in two closely related groups of painted ware.

One soon learns by experience to associate a given motive with a given paste, slip, quality of modeling, and the character and num-

¹ "Ancient Art of the Province of Chiriqui," *Sixth Annual Report, Bureau American Ethnology*, 1888.

² "A Study of Chiriquian Antiquities," *Memoirs Connecticut Academy of Arts and Sciences*, III, 1911.

ber of the colors employed, as well as the method of their application. After the armadillo ware, perhaps the largest group is the one to which Holmes gave the name *lost color* ware, the designs being produced by the removal of color rather than by its direct application. In addition to the process of negative painting employed, this group is also characterized by distinctive forms as well as the nature of the paste and the colors, also the degree of finish (or absence of it) to which the modeling was carried.

The lost color vessels present a wide range in point of form and size, although a large majority are globular vases or bottles of medium size. The necks being small, the interior was left in a semi-unfinished state since it was not visible. Handles, tripod supports, and motives in relief are rare. The chief merit of this class therefore lies in the painted designs. These being negative are in the color of the original ground which varies from cream to red. The interstices and the whole background for the designs are in black.

While there is a singular consistency running through the designs produced by the lost color process, for a long time they baffled interpretation, with one exception. In tracing out various motives found on the alligator ware I was able to identify one as being a conventionalized rendering of the dorsal aspect of that animal. It represents the rows of spines and scales on the back of the alligator by a number of parallel lines, the outer ones alone bearing the spine, scale, or scale-group symbols, and these only along their outer margins. This motive I also found in the lost color ware. But a majority of the designs consists of rhomboidal figures, triangles, associated bands composed of groups of straight lines, and designs in the shape of fronds and waving arms. They are found alone as well as in combination. The fronds, waving arms, triangles, and straight bars, as well as the lozenge-shaped designs are often associated with series of dots. What is the meaning of all this? At first glance they seem far removed from the motives derived from animal forms so characteristic of other groups of Chiriquian pottery. Could they be plant derivatives? Are they perhaps simply the products of uncontrolled fancy?

A key to the mystery recently came to light in the shape of a more realistic rendering of the motive than had been known hitherto. It consisted of a lozenge-shaped body to which were attached eight waving arms. It filled a circular panel on the two sides of a round-bodied lost color vase collected by Mr. George G. Heye while on a trip to Chiriqui in 1913. This vase to which Professor Marshall H. Saville had called my attention was recently published by me.¹ The design represents an octopus. At that time, I pointed out its kinship to many designs previously published by Holmes and myself, but the significance of which had not been understood.

A further study tends not only to confirm what was said in my last note but also to emphasize the importance of this newly dis-



FIG. 28.—Octopus motive. The eight appendages appear to be attached to the neck of the vase which serves as the octopus body. Yale collection. 1/3 size.

covered motive as the one distinctive feature of lost color symbolism in ancient Chiriquian art, and as another example of how a whole group of related motives in primitive art may be traced to a single zoöomorphic prototype.

Recently in going over some duplicate Chiriquian pottery with a view to making an exchange, I came across several new variations

¹ "Note on the Archeology of Chiriqui," *American Anthropologist*, N.S., XV, 661-667, 1913.

of the octopus motive. In one shapely vase the eight octopus appendages are evenly distributed over the upper zone, being attached to a line just below the neck of the vessel (fig. 28). The neck and aperture thus take the place of the octopus body and mouth. The artist's point of view can perhaps be better appreciated by looking down on the vase from above rather than by a side view.

A similar idea but expressed in a different way is shown in figure 29 (fig. 167 of Holmes' monograph). Here the arms are



FIG. 29.—From Holmes. (Sixth Annual Report, Bureau of American Ethnology, fig. 167.)

attached to the equatorial zone (or slightly lower) and rise like short-based triangles to the neck of the vase. They are dotted to represent the suckers. In looking down upon this vase the arms converge toward the narrow neck of the vessel, which thus becomes the mouth opening of the octopus. The body of the vase therefore becomes the body of the octopus, which is represented not only in painted design but also in the round.

In this class likewise belongs a vase published by Holmes (fig. 181), and reproduced here in figure 30. The four triangles in the upper zone pointing toward the neck of the vessel are marked by octopus suckers. Alternating with these four triangular appendages are four groups of parallel vertical lines each group being accompanied by four frond-like octopus appendages.

Thus the octopus appendage may be represented in two ways: as a frond-like arm, or as a short-based triangle. Each type is often (but not always) accompanied by dots representing the suckers. Both types are seen in figure 31. Four of one kind alternate



FIG. 30.—From Holmes. (Sixth Annual Report, Bureau of American Ethnology, fig. 181.)

with four of the other kind converging toward the neck of a small globular vase with black ground and cream pattern. The four fronds are straight, each consisting of two lines enclosing a row of dots. Each triangular arm is set in a series of paired converging lines the outer ones being accompanied by sucker dots. An identical octopus design is repeated on the lower half of the vase, beginning midway and with the eight arms converging toward a central point on the bottom.

Another variation of this idea I discovered in the Carnegie Museum, Pittsburgh, while there recently. The vase in question is part of an exchange collection sent from the Yale University Museum to Pittsburgh, before the author had identified the octopus motive. Four of the arms are indicated by triangles

rising from the equatorial zone to the neck. The spaces that would otherwise have been filled by the four suppressed arms are each filled by a pair of triangular arms arranged horizontally, and each accompanied by a single row of dots, an excellent example of how difficult it is to down a dominant motive once it has taken firm hold on art tradition. In order that there may be no mistaking the significance of these triangles, each is accompanied by dots paralleling one or both of the long sides but never the base of the triangle (see figs. 29, 30, 31, and 45).

In another exchange collection sent from Yale to the American Museum of Natural History, of the twenty-five vases



FIG. 31.—Two varieties of the octopus appendage motive. Four arms of each kind rise toward the neck of the vase; this design is repeated on the lower half of the vase. Heye collection, cat. no. 7461. 1/2 size.

belonging to the lost color ware about 95 per cent. are decorated with some form of the octopus motive. In one the shoulder zone is divided into five panels by means of groups of from three to five vertical lines. These groups themselves may stand for the frond-like octopus arm. Parallel to the outer lines of each group run the bases of a pair of short-based triangles, the long sides of each triangle being accompanied by dots. Were it not for the dots the design produced by the vertical lines and abutting horizontal triangles would exactly duplicate one variety of a design that I had previously named the dorsal-view motive of the alligator.

On the shoulder zone of a small vase in the Heye Museum the decorative elements are somewhat differently disposed and would

never be mistaken for a dorsal-view motive of the alligator. The two kinds of octopus arm are each repeated five times; but there are only two triangles in each group, and these, one above the other, both point toward the neck of the vase; they are not dotted. On the other hand the alternating groups of vertical lines (from three to four in number) enclose rows of sucker dots. The pattern is of cream color on a black ground. The bottom of the vase is plain red.

Akin to all the foregoing is an octopus motive produced by shifting the mouth opening from the neck of the vase to an equatorial point on the side of the body and representing it by means of a painted circle. In order to eliminate as it were the neck and aperture of the vase from consideration, a large circular panel is formed about this make-believe mouth opening as a center. The eight arms converging from the periphery of the panel toward the

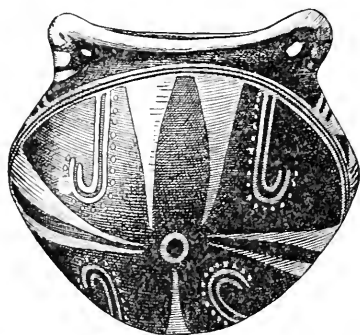


FIG. 32.—Octopus motive. The two kinds of arms converge toward the center of a circular panel. Yale collection. 1/2 size.



FIG. 33.—From Holmes. (Sixth Annual Report, Bureau of American Ethnology, fig. 171.)

central mouth opening produce the same effect as though one were looking down on the vase in figure 29. This gives the design that in earlier publications was called the rosette. It is simply a variety of the octopus motive and is met with perhaps oftener than any other single variety. In order the more easily to arrive at a circular panel, the body of the vessel was made spherical and the neck small, two characters common to lost color vases. It is therefore probable that the exigencies of the design tended to control the shape of the vessel, and vice versa.

A good example just rescued from the duplicate material in the Yale Museum is reproduced in figure 32. In this case a certain amount of artistic license is taken. Four of the arms are frond-like and bear suckers; the alternating four are straight, tapering (the triangular type), and are not accompanied by rows of dots. Three of these are in duplicate without seriously cloaking the fact that the total number of arms is to be counted as eight.

An exceedingly ingenious and well-balanced use of the rosette type of octopus motive is given in figure 33 (Holmes' fig. 171). Here the artist succeeded in securing a complete octopus motive, no matter whether the vase was viewed from the top, bottom, or the side. In order that the rosette on the side might not over-balance the design grouped about the neck or the bottom of the vase, an equatorial horizontal band cuts each circular panel in two, thus blotting out the customary mouth opening in the center of the circular panel. Viewed from the top, therefore, one must include in the motive the upper half of each rosette and the pointed or triangular arm in duplicate occurring in each alternating space between the rosettes. This gives the same number and disposition of arm groups about the neck of the vase as in each rosette, that is to say, frond-like suckered alternating with pointed arm groups, and eight in all. It will also be seen that a like disposition of arm groups is repeated about the bottom of the vase. In speaking of the rosettes Holmes had this to say: "It is clear however that these devices showing curves, hooks, and dots are not of technical or mechanical origin, but that they refer to delineative originals of which they are survivals; but we must remain in the dark as to what the originals were or what was the precise nature of the idea associated with them in the mind of the decorator." The veil of darkness has finally been lifted. We now know that the original was one common in Isthmian waters, the octopus.

A still greater license as to the duplication of arms, keeping however the number of arm groups down to eight, is seen in figure 34. The mouth opening is spool-shaped instead of circular. The spool consists of two triangular-arm motives fused at their apexes. (In a vase belonging to the Heye Museum the margins of each

of the two fused triangles, bases excepted, are accompanied by dots.) The suckered arms have lost their frond-like character. Each of these arms is represented by three parallel lines cut at their extremities by means of a short line at right angles. The dots representing suckers are arranged along the outer margins of the



FIG. 34.—Octopus motive forming a rosette. The suckered arms have lost their frond-like character. Yale collection. 1/2 size.



FIG. 35.—The octopus appendage motive used independently as a panel decoration. Yale collection. 1/2 size.

outer lines. By placing the suckers within the field bounded by these lines, one arrives at the stage reproduced in figure 35, which would never be taken for an octopus motive were it not for the intervening stages. In some examples of this sort, a pair of characteristic triangular octopus appendages are placed in each of the spaces alternating with the two arched panels.

If this is the octopus motive then we must include such examples as figures 36 and 37. In figure 36 there are exactly eight conventionalized suckered appendages converging toward the neck of the vase, and four appendages of the triangular type.

Before passing from the rosette type of octopus motive in which the mouth opening is placed equatorially on the side of the vessel, attention is called to a novel grouping of the eight octopus arms, not converging toward a mouth opening in the center of a circular

panel, but grouped in original fashion about a mouth opening in the center of a four-sided panel (fig. 38). Two additional representations of the mouth opening are added beneath the two lower appendages.

As has already been said, the octopus appendage motive ap-



FIG. 36.—The octopus motive as a shoulder decoration. Yale collection. 1/2 size.

pears under two rather distinct forms: the waving type of arm composed of two or more parallel lines, and the short-based triangle. Each of these types is sometimes accompanied by a series of dots to represent suckers. In the more conventionalized examples the waving arms become straight; in these cases the dots are apt to be within the boundaries of the lines composing each arm. In figure 39, four such arms form a broken zigzag in an arched panel. Alternating with these are five arms of the triangular type. On the opposite side in a four-sided panel are also four arms in zigzag, alternating with three triangular arms; so that in the two panels there are a total of eight arms of each type.

Such examples as these are evidently the key to the meaning of the groups of straight parallel lines, unaccompanied by dots and arranged in broken zigzags which decorate arched panels on so many vases of the lost color group. Mr. George G. Heye of the Heye Museum purchased in 1915 a collection of Chiriquian antiq-

uities including a vase decorated with a happy combination of octopus motives (fig. 40). In the space left on each side between the two arched panels is a lozenge-shaped octopus body to which



FIG. 37.—Octopus appendage motives arranged in broken zigzag as a panel decoration. Yale collection. $\frac{2}{5}$ size.

are attached four waving appendages and one triangular type of appendage, its apex in contact with the lower point of the lozenge-shaped body. This design combines every element contained in a



FIG. 38.—Eight octopus appendages grouped around a central mouth opening so as to form a novel panel decoration. Yale collection. $\frac{1}{2}$ size.

complete octopus representation with the exception of sucker dots. In the arched panels are groups of straight parallel lines also unaccompanied by dots and arranged in broken zigzag. As if to aid in



FIG. 39.—Two types of octopus appendage disposed alternately to form a panel decoration. Yale collection. $1/2$ size.

their interpretation triangles occupy the angles of the zigzag. These triangles are not dotted to be sure, but they are cross-lined in



FIG. 40.—Octopus body to which is attached four waving arms, and one of the triangular type. Octopus appendage motives fill the arched panels. Heye collection, cat. no. 4/1422. $1/3$ size.

a manner to suggest a dotted area. In other words the decoration in these arched panels consists of the two types of octopus appendage motive. Another example with variations is reproduced in figure 41.

A connecting link between the preceding two figures and those showing more realistic arms is reproduced (from Holmes) in figure 42. In one arched panel is a series of waving arms; in the other are plain straight arms in broken zigzag, which seem to alternate



FIG. 41.—Two types of the octopus appendage motive used as panel decorations. Yale collection. 1/2 size.

with arms of the triangular type. The frond-like appendage motive is repeated in the two interspaces alternating with the arched panels. In one Yale example the dotted banded appendage is repeated in a zigzag that completely encircles the shoulder zone; alternating with this are two series of triangular arm symbols (bearing dots along two sides but not along the base), one series pointing downward from the neck, and the other pointing upward from the equatorial band.

With slight variations a similar treatment of the shoulder zone is often met with.

In figure 43 the whole body of the vase is divided into four vertical panels by means of two vertical bands each composed of four parallel straight lines; one of the two bands cuts the other at the bottom of the vase. In each of the four panels thus formed is a broken zigzag composed of four octopus arms; so that in the four



FIG. 42.—From Holmes. (Sixth Annual Report, Bureau of American Ethnology, fig. 180.)

panels sixteen octopus appendages are represented. While emphasizing the fact that octopus appendage motives do very often occur in eights or in multiples and even divisors of eight, it should be distinctly borne in mind that the rule is by no means universal. The wonder nevertheless is that the artist should have so often taken the trouble to emphasize his meaning by an appeal to arithmetical proportions.

The broken zigzag may be even further disguised by filling the interspaces with series of dots or with dotted circles (fig. 44). These represent suckers and mouth openings. Alternating with

the two arched panels and reaching downward from the neck are two octopus arms of the triangular kind. The design below the equatorial band consists of eight groups of parallel lines (two or more in each group), converging toward a central point on the bottom of the vase, evidently another method of giving expression to the octopus motive. Groups of lines on the lower zone converging toward the bottom of the vase are employed extensively and exclusively in the lost color ware. All are traceable to the same original, the octopus.

We have already pointed out several examples of the triangular type of octopus appendage motive. An additional example is reproduced in figure 45. Practically the entire body of the vase is



FIG. 43.—The octopus appendage motive in the form of broken zigzags filling the four panels. Yale collection. 2/3 size.



FIG. 44.—Highly conventionalized octopus motives, in which are recognized traces of the broken zigzag. Yale collection. 1/2 size.

covered by six arched panels, three on the shoulder and three below the shoulder reaching nearly to the bottom of the vase. The triangular octopus arm is repeated three times in each of the shoulder panels, and five times in each of the lower panels, making twenty-four in the six panels. In each of the three shoulder interspaces there is one octopus arm, and one is to be found in the space left over at the bottom. Suckers are represented on the two longer sides of each triangle, a condition met with in many examples of

this motive; but the base of each triangle is free of dots (see figs. 29, 30, 31). Two of the arms in two of the lower panels are of diminutive size and twinned; two small triangles are united at their apexes forming a spool-shaped design that is used to represent the mouth opening in some of the rosette octopus motives (see fig. 34). The spool-shaped symbol that is sometimes repeated till it covers



FIG. 45.—Octopus appendages in the shape of short-based triangles. Suckers are indicated on the two longer sides of each triangle but never along the base. Heye collection. 1/2 size.



FIG. 46.—Zonal decoration consisting of the octopus body motive enclosing sucker dots. Yale collection. 1/2 size.

the whole body of vases is thus intimately associated with the octopus, from which it may be looked upon as a derivative.

The triangular octopus appendage is frequently repeated a dozen or more times to form a zonal or a rosette ornament. In some zonal examples the points are directed downward; in others they converge toward the neck. Good examples were published by Holmes (figs. 163, 164) and in my monograph (fig. 195). In rosettes the points converge toward the center of the circular panel, or radiate toward the perimeter as the case may be.

Referring to the key specimen published in my last note, we find the octopus body represented by a rhomboidal or lozenge-shaped figure. In some realistic examples showing appendages attached to the body, the dots representing suckers are placed within the field of the body rather than on the appendages. Remembering the freedom with which the ancient Chiriquian artist

suppressed or transposed parts, one would expect to find cases where the body is represented and the appendages omitted. This would give an octopus body motive. The body motive, as was the case with appendage motives, is repeated to form zonal or other ornaments (fig. 46). As might be expected, it is not limited to the lozenge form. Any four-sided, perhaps even rounded or triangular design would answer the symbolic requirements, especially if it contained dots to suggest suckers and, by inference, the appendages on which they grow. In one Yale vase the shoulder zone consists of a series of dotted lozenge-shaped octopus body motives, alternating with the spool-shaped symbol, which as we have already stated consists of two octopus arm motives of the triangular type fused at their apexes.

Thus practically all the puzzling designs of the lost color ware which once seemed so far removed from a zoömorphie original are traceable to the octopus. The box-shaped and kindred figures bearing waving appendages represent the octopus unit, as do also the rosettes and appendage groups surrounding the necks of vases. The body portion may be used alone and repeated as a motive independent of the appendages, especially if sucker symbols are associated with it. On the other hand the appendages are employed in like manner independent of the body, either with or without the accompaniment of dots. The appendage motive appears as varieties of two types: the short-based triangle and the banded design composed of two or more parallel lines; these lines, and hence the band itself, may be sinuous or straight.

A reëxamination of the lost color group therefore leads inevitably to the conclusion that it is dominated by the octopus even more completely than the armadillo and the alligator respectively dominate two other important Chiriquian ceramic groups. It appears unmistakably under one guise or another on perhaps nine-tenths of all the lost color vases hitherto published; a cursory study of the large duplicate series in the Yale Museum shows that at least as large a percentage holds true of unpublished specimens. If a new name were needed for the group, *octopus* ware would thus be most appropriate.

With such an exuberant proliferation of motives derived from a single zoöomorphic original, there is of course ever present the possibility of the overlapping of motives that started from wholly different originals. I have already referred to the occurrence of the dorsal-view motive of the alligator on lost color ware. It is highly probable that the overlapping of this motive (perhaps also the scale-group and spine motive) and the one derived from the suckers and appendages of the octopus has taken place to some extent; due to the convergence toward a common type of scale-spine symbols of the alligator on the one hand, and appendage-sucker symbols of the octopus on the other. In so far as ancient Chiriquian art may serve as a guide, however, instead of accounting for the evolution of the various motive groups, such overlappings are rather to be considered as exceptions that prove the rule.

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NOTE ON THE MOLAR TEETH OF THE PILTDOWN MANDIBLE

By WILLIAM K. GREGORY

MR. GERRIT S. MILLER¹ in his paper on the Piltdown lower jaw maintains that this mandible does not belong with the human skull near which it was found, but represents an extinct species of chimpanzee, which he names *Pan vetus*. Thus he carries to its logical conclusion the line of argument which had been opened by Professors Watersons, Boule, and others who had doubted the anatomical association of the mandible with the skull fragments. But, while these earlier sceptics had made only brief criticisms of Dr. Smith Woodward's reconstructed *Eoanthropus*, Mr. Miller has gone into the problem in a most thorough manner and was the first to make and publish extended comparisons between the Piltdown jaw and teeth, and those of a large series of chimpanzees. From this series he selects certain jaws, of very old animals, which, as everyone must admit, exhibit an extraordinary resemblance in all views to the Piltdown mandible.

Of course the real question is, does this resemblance imply generic identity or is this after all a human jaw that is practically indistinguishable from an ape jaw? Speaking only for myself as a student of recent and fossil animals I recognize that the resemblances in question constitute generic identity, that Mr. Miller's illustrations furnish a demonstration of the generic identity of the Piltdown jaw and the chimpanzee jaws there figured. And Dr. W. D. Matthew² and Dr. MacCurdy³ have already testified to the same effect. But while the resemblances and differences are in a sense objective phenomena, the cognition, or perception, of generic

¹ "The Jaw of the Piltdown Man," *Smithsonian Miscellaneous Collections*, Vol. 65, No. 12, 1915, pp. 1-31, pls. 1-5.

² *Science*, N.S., Vol. XLIII, Jan. 21, 1916, p. 107.

³ *Ibid.*, Vol. XLIII, No. 1103, Feb. 18, 1916, p. 228.

identity is an individual experience, like the perception of truths and abstract propositions. Hence it must be expected that for some time to come men will differ in their reactions to Mr. Miller's evidence, in accordance with their individual history and preconceptions. Dr. Smith Woodward, for example, the describer of *Eoanthropus*, is still firm in his belief that the Piltdown jaw belongs with the Piltdown skull, which was found, along with remains of other mammals, in the same place. The question of association is discussed elsewhere by Dr. Matthew¹ and will be passed over here, with the remark that according to this authority, the association of jaw and skull in space, in view of all the circumstances, is of little value against the anatomical evidence that the remains belong to two different animals.

In the course of a general review of the extinct anthropoid apes and men² I have had the accompanying illustration (fig. 47) prepared, for the purpose of showing the molars of the Piltdown jaw in comparison with those of several extinct and recent races of Hominidæ and Simiidæ. The figure of the Piltdown molars (d) is based upon a very clear photograph published by Dr. Smith Woodward,³ which appears to be more accurate than the hand-colored casts of the specimen. The two molars, although extremely worn, reveal the remains of what I have elsewhere called the "*Dryopithecus* pattern," because this pattern is most clearly developed in the Upper Miocene genus *Dryopithecus* of Europe and Asia; it is retained with more or less modifications in the chimpanzee, gorilla, and orang, and clear traces of it are found in many human teeth. The Piltdown molars agree with the chimpanzee molars figured by Mr. Miller (our fig. 47 c) and differ from the human types (e f g) in the following characters: (a) they are decidedly more elongate anteriorly, so that the crown as a whole is more quadrilateral than circular; (b) the hypoconids are smaller and do not project laterally,

¹ *Bull. Amer. Mus. Nat. Hist.*, Vol. XXXV, 1916, pp. 348-350.

² "Studies on the Evolution of the Primates." Part II, "Phylogeny of Recent and Extinct Anthropoids, with Special Reference to the Origin of Man." *Bull. Amer. Mus. Nat. Hist.*, Vol. XXXV, 1916, pp. 239-353.

³ "A Guide to the Fossil Remains of Man in the Department of Geology and Palæontology in the British Museum (Natural History)," London, 1915, pp. 1-33, 4 pls.

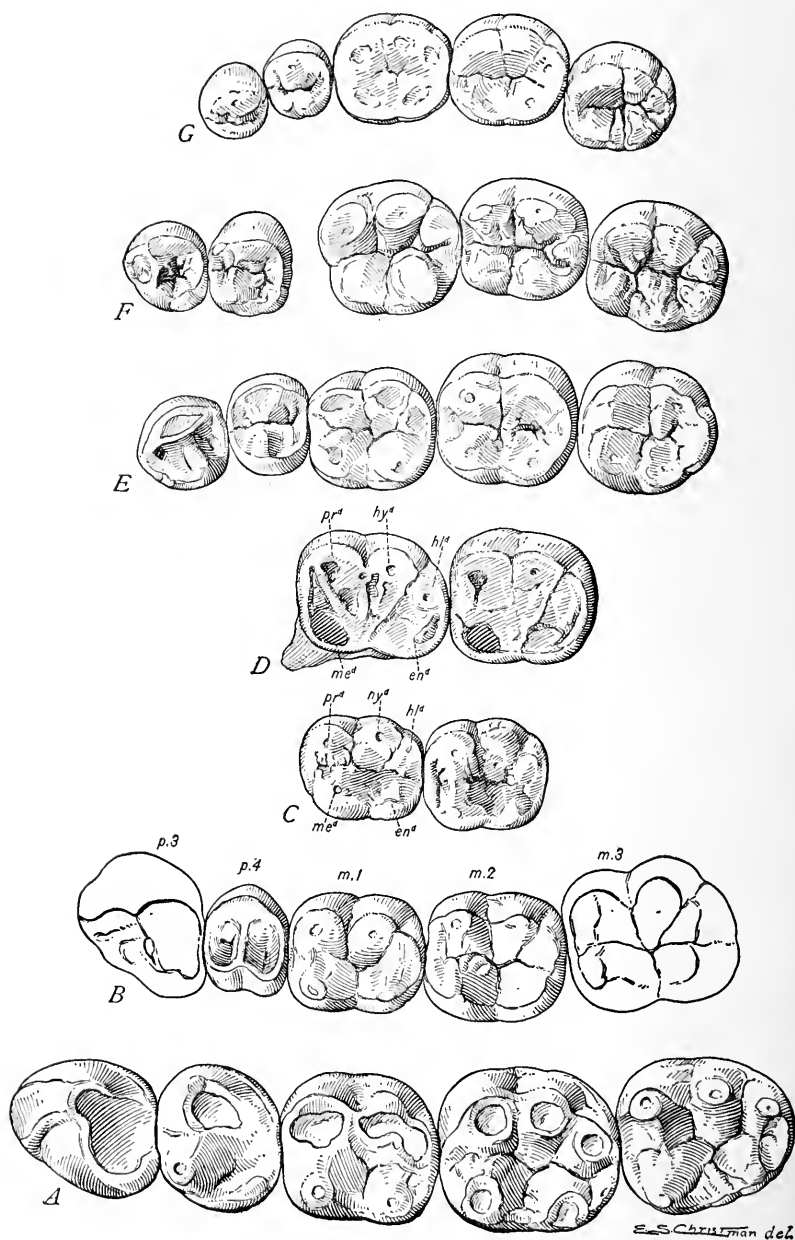


FIG. 47. See page 387 for legend.

so that the transverse diameter of the posterior moiety of the tooth, from the outer side of the hypoconid (*hyd*) to the inner edge of the entoconid (*end*), is less than the transverse diameter of the anterior moiety, from the outer side of the protoconid (*prd*) to the inner side of the metaconid (*med*); (*c*) both the metaconid and the entoconid are somewhat smaller and more widely separated from each other than in the human teeth; (*d*) the deep furrow between the metaconid and the entoconid appears to have been continued in an oblique straight line into the furrow between the hypoconid and the hypoconulid (*mesoconid*), whereas in human teeth the furrow between the metaconid and the entoconid is often directly transverse in position and is separated from the furrow between the hypoconid and the hypoconulid by the short furrow that divides the hypoconid from the entoconid.

Now there is rather a wide variation of form in the molar crown patterns both of human races and of apes, and it may be that some human teeth will exhibit one or more of the ape characters enumerated above. But so far as my observations extend (and I have examined a good many ape jaws and human jaws) no provedly human lower molars exhibit all of these characters and no ape molars lack all or even a majority of them. Hence I believe that Mr. Miller is fully justified in holding that the lower molars of the Piltdown jaw are those of a chimpanzee and not those of an extinct genus of Hominidæ.

AMERICAN MUSEUM OF NATURAL HISTORY,
NEW YORK CITY

FIG. 47.—Right lower premolar-molar series of primitive men and of anthropoids. Crown views. \times circa $3/2$.

- A. *Gorilla* sp. Recent.
- B. *Sivopithecus indicus*. Upper Miocene, India. After Pilgrim.
- C. *Pan* sp. Much worn molars of an old chimpanzee. After Miller.
- D. *Pan vetus*. Much worn molars of the Piltdown mandible; from a photograph published by Smith Woodward ($\times 3/2 +$).
- E. *Homo heidelbergensis*. From a photograph published by Schoetensack.
- F. *Homo sapiens*. Molars of an old female Australian black. Premolars of a male negro.
- G. *Homo sapiens*. Lower premolar-molar series of a Strandlooper Bushman. (Gift of Dr. R. Broom.)

From this series it appears that Mr. Miller is well warranted in stating that the Piltdown molars are generically referable to *Pan* rather than to *Homo*.

CERTAIN PRE-COLUMBIAN NOTICES OF AMERICAN ABORIGINES ¹

By WILLIAM H. BABCOCK

IT may be best to take up these old stories and statements in geographical, rather than chronological, order, beginning with the region which faces Iceland and is nearest to Europe.

THE EASTERN COAST OF GREENLAND

The Floamanna Saga, attributed by Vigfusson in its older parts to the thirteenth century, with some revision and additions in the fourteenth, relates the voyages and adventures of the notable hero Thorgisl a little before the opening of the eleventh century. Eric the Red had invited him from Iceland to Greenland, but his party, the saga tells us, "wrecked their ship one day under the mountain glaciers of Greenland in a certain bay upon a sand bank. . . . They all made a hall together"—for winter quarters; but it proved a very gruesome home, for one after another went mad and died and the living fancied themselves haunted by the dead. Later, Thorgisl's wife was stabbed to death in bed beside her child and there were divers soul-trying and even preternatural experiences.

For one thing:—

In the morning, when Thorgisl came out, he saw a great mass of drift in an ice hole and by it there were two giant women in kirtles of skin and they were trussing up mighty burdens. Thorgisl ran up and cut at one of them with his sword, Earth House Loom, as she was bearing the burden on her back and slashed off her arm close to the shoulder. Down fell the burden and she ran away.

The subsequent course of Thorgisl and the remnant of his people in reaching the established Greenland settlements on the southwestern side leaves no doubt that this occurrence took place, or was understood to have taken place, on the rarely attempted icebound eastern face of Greenland. Apparently, these misunder-

¹ Read before the Anthropological Society of Washington.

stood and exaggerated women, clad in skins and gathering driftwood bundles, were simply Eskimo of that region. The occurrence may very well have been a real one.

WESTERN SHORE OF GREENLAND

The surviving libellus or abridgment of Are Frode's lost *Islendingabok*, which stands at the very beginning of Icelandic literature and was composed in the twelfth century, informs us:—

The country which is called Greenland was discovered and colonized from Iceland. Eric the Red was the name of the man, an inhabitant of Breidafirth, who went thither from here and sett'ed at the place which has since been called Ericsfirth. He gave a name to the country and called it Greenland and said that it must persuade the men to go thither if the land had a good name. They found there, both east and west in the country, the dwellings of men and fragments of boats and stone implements, such as that it may be perceived from these that manner of people had been there who have inhabited Wineland and whom the Greenlanders call Skrellings.

But these Eskimo had withdrawn and remained aloof for a long time, their characteristics apparently being inferred by the Norsemen from uncertain analogy. Norse hunters and fishers, however, ranged far afield in the northern wilderness above the Western settlement and the game would naturally draw marksmen of the two races together. One such, Thorhall the Hunter, is perhaps the most picturesque figure of the Saga of Eric the Red, and is there presented as the author of divers verses, imbedded in the story, which are credited to the eleventh century by their diction and meter. Also, two fragments of lost sagas are cited as relating that the more prosperous Greenland settlers owned ships which went to Nordsetr, apparently the general name for the most northern hunting districts, and maintained huts at two well-known points for something like hunting lodges or seats. One of these parts of the coast was called Greipar and the other Krog-sfiordheath. The latter is thought to have been a little above, or a little below, Disko Island; but there is great uncertainty.

The meeting of these widely wandering men with Eskimo hunters similarly engaged is related in a manuscript found in Scotland and considered to be of the thirteenth century. It is

known as the *Historia Norvegiæ* and contains, among other things, a geographical description of northern lands, including the following passage, which, in the opinion of Dr. Storm, may relate to events in the twelfth century, though there are perhaps indications that they belong to a hundred years later.

Beyond the Greenlanders towards the north, (says this manuscript), the hunters come across a kind of small people called Skrellings. When they are wounded alive their wound becomes white without any issue of blood; but the blood scarcely ceases to stream out of them when they are dead. They have no iron whatever and use whale teeth for missile weapons and sharp stones for knives.

It may be inferred that the intercourse between these borderers of competing races was not wholly placid and amiable.

We have also a rather frequently quoted narrative of an Arctic exploring expedition in the year 1266, which seems to have been prompted by uncertain reports of these uncivilized people, with perhaps some disquiet as to their intentions and an intelligent desire to know more about them and the region whence they came. It is contained in Hauksbók, a compilation copied out from various earlier writings by and for Hauk Erlendsson, a knight of Norway and lawman of Iceland, some time between the years 1300 and 1334.

This account wrote the priest Holdr from Greenland to the former Greenland priest Arnold, court priest on board the Knorr in which Bishop Olaf traveled to Greenland. That summer when the priest Arnold left Greenland and they suffered shipwreck on the coast of Iceland there were found out in the sea some pieces of timber which had been hewn with small axes or adzes and among them one in which were set tooth wedges and bone wedges.

That summer there came people also from Nordsetr, who had traveled farther north than we had hitherto heard of. They saw no signs that the Skraelings had lived there, except at Krogfiordsheath, and it is thought that this must be the shortest way for them to go from wherever they get there. Thereupon the priests sent a ship northward, in order to explore the regions north of the farthest point which they had hitherto visited; but they sailed out from Krogfiordsheath until they lost sight of the land. Then they had a south wind against them and darkness and they had to let the ship go before the wind; but when the storm ceased and it cleared up again they saw many islands and all kinds of game, both seals and whales and a great number of bears. They came right into the sea-bay and lost sight of all the land, both the southern coast and the glaciers, but south of them were also glaciers as far as they could see. *They saw signs that the Skraelings had dwelt there in former times*, but on account of the bears they could not

land. Thereafter they sailed back in three days and found some remains of Skraelings on some islands south of Snaefell. Then they sailed southward to Krogfordsheath, one good day's rowing. St. James' Day (July 25th) it was frosty at night but the sun shone both night and day and was not higher in the south than that when a man placed himself athwart-ships in a six oared boat with his head up against the railing (or gunwale) the shadow of that side which was nearest to the sun would strike his face; but at midnight the sun was as high as at home in the settlement when it is in the northwest. Thereafter they traveled home to Gardar.

There have been various estimates of the distance traveled northward. It would appear that they sailed a long way up Baffin's Bay, touching at several points, but seeing no Eskimo and nothing more than the signs of their former occupancy, such as the Norse Greenlanders of the settlements had seen almost three centuries before near their home.

After this there are accounts of hostilities and the abandonment of the Western settlement in the fourteenth century; also later attacks on the Eastern settlement, all probably indicating a continued or intermittent Eskimo movement down the coast. But they tell us nothing of these people themselves except a greater degree of belligerency than has been usual in recent times.

Perhaps the latest notice of West Coast Eskimo during the Norse period is found in a passage quoted by Thalbitzer from Danish historical records for Greenland, concerning four ships which sailed to Greenland in 1385, spending two winters there, and more particularly the skipper of one of these, one Bjorn Einarson Jorsalafafari. We are told:—

The Greenlanders made Bjorn Bonde a grant of Erichsfjord district while he stayed there. . . . At last he was benefited by the chance that he had happened to rescue two trolls, a young boy and his sister, from a rock which was washed over at high tide. They took an oath of allegiance to him and from that time he did not lack provisions, for they were experienced in all kinds of hunting and fishing, no matter what he needed or desired. The girl-troll considered it the greatest favor when she was allowed to carry and pet the little boy baby which her mistress had just given birth to. She also wanted to wear a head-dress which resembled that of her mistress, but she made it of whale's gut. The brother and sister killed themselves and threw themselves down the cliffs into the sea when they were prohibited from following along with Bjorn Bonde, their beloved master, to Iceland.

MARKLAND, PROBABLY NEWFOUNDLAND

This seems to have been the most frequently visited of all the regions beyond Greenland. At any rate, it is the one of which we have the latest record, that of a small Greenland vessel which reached Iceland in 1347, after having made the Markland voyage. The only Norse reference to the inhabitants of this region seems to be the very early one in the saga of Eric the Red, copied into Hauksbók probably about 1320 or 1330, but in parts belonging to the eleventh century, though this particular passage may be less ancient. Of the voyage of Thorfinn Karlsefni and his companions, 1003 to 1006, it relates:—

When they sailed away from Wineland they had a southerly wind and so came upon Markland, where they found five Skrellings, of whom one was bearded, two were women and two were children. They bore the lads away with them and taught them to speak and they were baptized. They said that their mother's name was Vaetelldi and their father's Uvaegi. They said that kings governed the land of the Skrellings, one of whom was called Avalldamon and the other Valldidida. They stated that there were no houses there and the people lived in caves and holes.

There has been much discussion as to whether these young Skrellings were Eskimo or Indians. Perhaps the latter is more probable.

They related certain rumors of other people near them, who wore white garments and carried rags on poles and shouted, so that their captors thought it must be Great Ireland, known also as White Man's Land. But this may be disregarded, as at best only hearsay and perhaps merely reflecting the traditions of the Icelandic people about them.

WINELAND AND ITS NEIGHBORHOOD

Another and more tragical encounter occurred apparently on the southeastern shore of the Gulf of St. Lawrence, according to Dr. D. Storm's interpretation of the data supplied by the Saga of Eric the Red, before quoted. It was probably at the mouth of the Margarie river or Mabou river, flowing mainly "from the east to the west" out of Cape Breton island.

It happened one morning that Karlsefni and his companions discovered in an open space in the woods above them a speck, which seemed to shine toward them, and it was a Uniped, who skipped down to the bank of the river where they were lying. Thorvald, a son of Eric the Red, was sitting at the helm and the Uniped shot an arrow into his inwards. Thorvald drew out the arrow and exclaimed: "there is fat around my paunch; we have hit upon a fruitful country and yet we are not likely to get much profit of it." Thorvald died soon after from his wound. Then the Uniped ran away toward the north. Karlsefni and his men pursued him and saw him from time to time and it seemed as if he were trying to escape. The last they saw of him he ran down into a creek.

No doubt the Uniped, like the giant women and trolls already mentioned, belonged to some one of the native races.

The later Flatey book narrative, still long pre-Columbian, gives a different version of the killing of Thorvald without any prodigy.

In the spring (after their arrival at Leifsbooths in Wineland) Thorvald said that they should put their ship in order and that a few men should take the after-boat and proceed along the western coast and explore thereabouts during the summer. They found it a fair well-wooded country; it was but a short distance from the woods to the sea and there were white sands, as well as a great number of shallows. They found neither dwelling of man nor lair of beast, but in one of the westerly islands they found a wooden building for the shelter of grain. They found no other trace of human handiwork.

The following summer Thorvald set out toward the east with the ship and along the northern coast. . . . They sailed to a headland which projected into the sea here and was entirely covered with woods. . . . They . . . discovered on the sands in beyond the headland three mounds; they went up to these and saw that they were three skin canoes with three men in each. They thereupon divided their party and succeeded in seizing all the men but one, who escaped with his canoe. They killed the eight men and then ascended the headland again and looked about them and discovered within the firth certain hillocks which they concluded must be habitations. They were overpowered with sleep . . . but awakened by the sound of a cry and a countless number of skin-canoes then advanced toward them from the inner part of the firth; whereupon Thorvald exclaimed: "We must put out the war boards on both sides and defend ourselves to the best of our ability, but offer little attack." This they did, and the Skrellings, after they had shot at them for a time, fled precipitately, each as best he could. Thorvald then inquired of his men whether any of them were wounded and they informed him that no one of them had received a wound. "I have been wounded in my arm-pit" said he, "an arrow flew in between the gunwale and the shield below my arm. Here is the shaft and it will bring me to my end."

After that he was buried in the most edifying way on a headland called Crossness.

This extract blends with the killing of Thorvald, a slaughter of Indians, told as a separate event by the earlier Hauksbók saga of Eric the Red, and by another nearly identical version transcribed later. This massacre seems to have occurred on the outer seacoast of America, probably somewhere in New England, during the return of Karlsefni and his party from their abandoned southern home at Hóp to their more northern and chief abiding-place at Straumfiord.

They sailed to the northward off the coast and found five Skrellings clad in skin doublets, lying asleep near the sea. There were vessels beside them containing animal marrow mixed with blood. Karlsefni and his men concluded that they must have been banished from their own land. They put them to death.

But everyway the most notable experience with the natives occurred at the relatively southern nearby land-locked bay or Hóp where Thorfinn's party maintained themselves about a year. The Saga of Eric the Red relates as follows:—

Now one morning early when they looked about them they saw nine skin-canoes and staves were brandished from the boats with a noise like flails and they were revolved in the same direction in which the sun moves. Then said Karlsefni, "What may this betoken?" Snorri's son Thorbrand answers him: "It may be the signal for peace, wherefore let us take a white shield and display it." And this they did, thereupon the strangers rowed toward them and went upon the land, marvelling at those they saw before them. They were swarthy men (or small men according to the later copy, A.M. 557) and ill looking and the hair of their heads was ugly. They had great eyes and were broad of cheek. They rowed away and to the southward round the point.

Karlsefni and his followers had built their huts above the lake, some dwellings were near the mainland, and some near the lake. Now they remained there that winter. No snow whatever came there, and all of the live-stock lived by grazing. And when spring opened, they discovered, early one morning, a great number of skin-canoes rowing from the south past the cape, so numerous, that it looked as if coals had been scattered broadcast out before the bay; and on every boat staves were waved. Thereupon Karlsefni and his people displayed their shields, and when they came together, they began to barter with each other. Especially did the strangers wish to buy red cloth, for which they offered in exchange peltries and quite grey skins. They also desired to buy swords and spears, but Karlsefni and Snorri forbade this. In exchange for perfect unsullied skins, the Skrellings would take red stuff a span in length, which they would bind around their heads. So their trade went on for a time, until Karlsefni and his people began to grow short of cloth, when they divided it into such narrow pieces, that it was not more

than a finger's breadth wide, but the Skrellings still continued to give just as much as before, or more.

It so happened that a bull, which belonged to Karlsefni and his people, ran out from the woods, bellowing loudly. This so terrified the Skrellings, that they sped to their canoes, and then rowed away to the southward along the coast. For three weeks nothing more was seen of them. At the end of this time, however, a great multitude of Skrelling boats was discovered approaching from the south, as if a stream were pouring down, and all their staves were waved in a direction contrary to the course of the sun, and the Skrellings were all uttering loud cries. Thereupon Karlsefni and his men took red shields and displayed them. The Skrellings sprang from their boats, and they met them and fought together. There "was a fierce shower of missiles, for the Skrellings had war-slings." Karlsefni and Snorri observed that the Skrellings raised up on poles a great ball-shaped body, almost the size of a sheep's belly and nearly black in color, and this they hurled from the pole upon the land about Karlsefni's followers, and it made a frightful noise, where it fell. Whereat a great fear seized upon Karlsefni, and all his men, so that they could think of nought but flight . . . for it seemed to them that the troop of Skrellings was rushing toward them from every side, and they did not pause, until they came to certain jutting crags where they offered a stout resistance. Freydis came out, and seeing that Karlsefni and his men were fleeing, she cried: "Why do ye flee from these wretches, such worthy men as ye, when, me-seems, ye might slaughter them like cattle? Had I but a weapon, methinks, I would fight better than any one of you." They gave no heed to her words. Freydis sought to join them, but lagged behind, for she was not hale; she followed them, however, into the forest, while the Skrellings pursued her; she found a dead man in front of her; this was Thorbrand, Snorri's son, his skull cleft by a flat stone; his naked sword lay beside him; she took it up, and prepared to defend herself with it. The Skrellings then approached her, whereupon she stripped down her shift, and slapped her breast with the naked sword. At this the Skrellings were terrified and ran down to their boats, and rowed away. Karlsefni and his companions, however, joined her and praised her valor. Two of Karlsefni's men had fallen, and four of the Skrellings. Karlsefni's party had been overpowered by dint of superior numbers. They now returned to their dwellings, and bound up their wounds, and weighed carefully what throng of men that could have been, which had seemed from the land; it now seemed to them, that there could have been but the one party, that which came from the boats, and that the other troop must have been an ocular delusion. The Skrellings, moreover, found a dead man, and an axe beside him. One of their number picked up the axe, and struck at a tree with it, and one after another (they tested it), and it seemed to them a treasure, and to cut well; and then one of their people hewed at a stone and broke the axe; it seemed to him of no use since it would not withstand stone, so he cast it down.

It now seemed clear to Karlsefni and his people that although the country thereabouts was attractive, their life would be one constant dread and turmoil by

reason of (the hostility of) those who dwelt there before, so they forthwith prepared to leave, and determined to return to their own country.

The Flatey book version of this same experience is as follows:—

In the summer succeeding the first winter Skrellings were discovered. A great troop of men came forth out of the woods. The cattle were hard by, and the bull began to bellow and roar with a great noise, whereat the Skrellings were frightened and ran away with their packs, wherein were grey furs, sables and all kinds of peltries. They fled toward Karlsefni's dwelling and sought to effect an entrance, but Karlsefni caused the doors to be defended. Neither could understand the other's language. The Skrellings put down their bundles and loosened them and offered their wares, but Karlsefni forbade his men to sell their weapons and he bade the women carry out milk to the Skrellings, which they no sooner saw than they wanted to buy it and nothing else. . . . Now it is to be told that Karlsefni caused a strong wooden palisade to be set up around his house. . . . Then said Karlsefni to the women "Do ye carry out the same food which proved so profitable before and nought else." When they saw this they cast their packs in over the palisade. Gudrid was sitting within in the doorway beside the cradle of her infant son Snorri when a shadow fell upon the door and a woman in a black namkirtle entered. . . .

Gudrid heard a great crash, whereupon the woman vanished and at the same instant one of the Skrellings who had tried to seize the weapons was killed by one of Karlsefni's followers. At this the Skrellings fled precipitately, leaving their garments and wares behind them.

Karlsefni planned for the impending attack as follows:—

Ten of our number shall go out on the cape and show themselves there while the remainder of our company shall go into the woods and have a clearing for our cattle when the troop approaches from the forest. We will also take our bull and let him go in advance of us. The lie of the land was such that the proposed meeting place had the lake on one side of it and the forest on the other. The Skrellings advanced to the spot and a battle was fought there, in which great numbers of the band of Skrellings were slain. There was one man among the Skrellings of large size and fine bearing whom Karlsefni concluded must be their chief. One of the Skrellings picked up an axe and having looked at it for a time he brandished it about one of his companions; and hewed at him, and on the instant the man fell down dead. Thereupon the big man seized the axe and after examining it for a moment he hurled it as far as he could out into the sea; then they fled helter skelter into the woods and thus their intercourse came to an end.

There has been much discussion as to whether these Wineland Skrellings were Eskimo or Indians. I think they were Indians.

It has seemed best to confine my notes to Norse sources, as

being the only ones reasonably well authenticated and certainly relating to inhabitants of America. It is well known that there are pre-Columbian Chinese records of the explorations of Buddhist monks, which some have supposed to extend to America; but the better opinion seems to be that only Corea, and perhaps other Asiatic or north-Pacific regions, were visited.

Also, the very puzzling and curious Zeno book, published late in the sixteenth century, purports to be a revival and reconstruction of an early fifteenth century narrative illustrated by a map. It embodies the adventures of a fisherman cast away about 1380 on the coast of Estotiland, probably Newfoundland, with subsequent journeys on the mainland far to the southwest; also the voyage of Earl Zichmi to Greenland and other points, not long after the year 1400. But either the entire document was forged after the time of Columbus or it was so transformed by the sixteenth century Nicolo Zeno, who rewrote and redrew it, that there is no item which we can safely trust. There is merely the possibility that the narrative may contain some real information about the condition of the Eastern Settlement of Greenland not long before its fall and concerning the contemporary population of Newfoundland and Cape Breton island, as well as certain regions below.

WASHINGTON, D. C.

SUGGESTIONS FOR CATALOGUING OF ANTHRO- POLOGICAL MATERIAL¹

BY BRUNO OETTEKING

THERE are three viewpoints of special consideration in the laying out of anthropological collections: the utilization of space; ready accessibility; and an adequate and practical cataloguing. The end of such collections lies in their scientific value for purposes of study rather than for exhibition in the Museum sense of the term, with a reservation in favor of a representation of phylogenetic features bearing on man's descent, changes in different stages of life, sexual and racial distinctions, etc. It follows that all material of this kind (skulls, bones, entire skeletons, cadavera and parts thereof) should be kept in such a state of cleanliness and preservation as to render it available for scientific research at any time.

Utilization of space and easy accessibility not only touch upon the matter of the available space, but also upon the inner arrangement of a collection. These points may best be treated with reference to the available space, making allowance for special decisions in special cases.

With regard to an adequate and practical cataloguing system, I should like to make the following suggestions.

I. DESIGNATION OF THE MATERIAL

Besides the consecutive numbers to be catalogued every object should be designated by one or more additional letters in order to facilitate an instantaneous identification. They are to be the first letters of their names in anatomical nomenclature. In case of several or numerous objects belonging to one and the same complex,

¹ For reasons explained in my review of Rud. Martin's "Lehrbuch der Anthropologie" (see *American Anthropologist*, 1915, Vol. 17, N. 4, pp. 751-754) I apply the term "anthropology" only in reference to man's physical traits as manifested in the living (somatology) and the dead (morphology).

like the different bones of a skeleton, the process described regulates itself in a simple way; the catalogue number remains the same for every object of such a complex and is followed correspondingly by the anatomical abbreviation. The following table lists such abbreviations (symbols):—

- 1—Cranium = Cr¹
 Calvarium = Cm
 Calvaria = Ca
 Calva = Cv
- 2—Mandibula = Md
- 3—Vertebrae = V
 V. cervicales = V/t
 V. thoracales = V/th
 V. lumbales = V/l } I, II, III, etc.
- 4—Sacrum = Sa
- 5—Costae = Co (I, II, etc.)
- 6—Sternum = St
 Manubrium = St/m
 Corpus = St/c
 Prox. xiphoideus = St/c
- 7—Scapula = Sc
- 8—Clavicula = Cl
- 9—Humerus = H
- 10—Radius = R
- 11—Ulna = U
- 12—Carpus = Cp
 Cp/n = Naviculare
 Cp/l = Lunatum
 Cp/tr = Triquetrum
 Cp/p = Pisiforme
 Cp/ma = Multangulum majus
 Cp/mi = Multangulum minus
 Cp/ca = Capitatum
 Cp/h = Hamatum
- 13—Metacarpalia = Mc (I, II, etc.)

¹ As "cranium" involves the state of completeness of this part of the skeleton, a part of a cranium might be referred to it in the designation. A frontal bone would have to be designated thus: 19Cr/fr, and inclosed in brackets in case of defectiveness (see page 401); 19 stands for a number of the catalogue. The designation of parts of the cranium in connection with the symbol of the latter should be written with small initials. Abbreviations for the other parts may be employed in this way: parietale = pt; occipitale = occ; temporale = tp; sphenoidale = sph; maxillare = mx; zygomaticum = zy palatinum = pl, etc., right and left to be distinguished as advised on page 401.

14—Phalanges manus = Ph/m (I, II, etc., a, b, etc.)

15—Pelvis = P

16—Os coxae = Oc

17—Femur = Fe

18—Patella = Pa

19—Tibia = T

20—Fibula = Fi

21—Tarsus = Ts

Ts/t = Talus

Ts/ca = Calcaneus

Ts/n = Naviculare

Ts/cu = Cuneiforme I, II, III

Ts/cb = Cuboideum

22—Metatarsus = Mt (I, II, etc.)

23—Phalanges pedis = Ph/p (I, II, etc.; a, b, etc.)

The application may be illustrated by a few examples. I should mark a cranium in this way: 300 Cr; the lower jaw belonging to it, 300 Md, where 300 stands for the number of the catalogue, Cr for cranium and Md for mandibula belonging to this cranium. In marking skulls I prefer the region of the frontal angle of the left parietal bone underneath and along the sagittal suture, so that

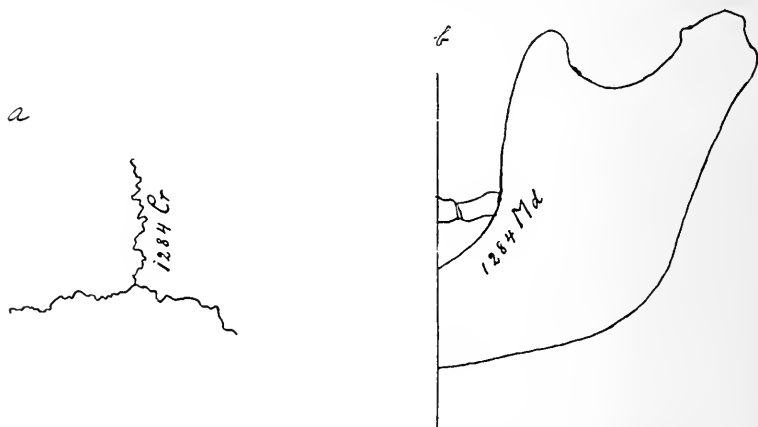


FIG. 48.—*a* is the designation of a skull on the frontal angle of the left parietal below and along the sagittal suture. *b* the designation of a lower jaw on its left ramus (outside) backward and along the linea obliqua.

the designation can be easily noticed. On the lower jaw I put the designation on the outside of the left ramus, backward of and in

line with the *linea obliqua* (fig. 48, *a*, *b*). Similarly favorable places might be selected on the other bones of the skeleton. Inasmuch as bones are not generally exhibition objects, there will be no occasion for their being defaced by applying numbers and letters in conspicuous places.

Right or left should be indicated by adding "d" or "s" (dexter and sinister), and in case of the sexes being known beyond doubt, by the signs used in biological sciences (♂ for the male, ♀ for the female). A female right femur I should then mark thus: 480 Fe. d. ♀; a male left humerus: 57 H. s. ♂; a male right metacarpal V: 193 Mc. V. d. ♂, etc.

For the sake of completeness I have also given a suitable designation for the small bones of the carpus and tarsus as well as for the phalanges of either (see table). But as these possess only small surfaces, too small to be marked extensively, it may be advisable to collect the bones belonging to such complexes in little boxes or bags and mark the contents on the outside according to the general plan. However, caution must be exercised so as not to mix them up, which can be avoided by marking them at least "d" or "s" (right or left).

In order to make them distinguishable at a glance, the designation of *defective* bones will have to be bracketed. 14 (H. d. ♂) for instance, indicates a defective male right humerus. If portions of this bone were to be designated singly, capital letters of the alphabet should be added: 14 (H. d. ♂) A; 14 (H. d. ♂) B, etc. Two portions of the skull for instance would have to be enumerated thus: 38 (Cr) A; 38 (Cr) B, in which case further signs are unnecessary and the information is found in the catalogue.¹ Such an enumeration applies of course only to cases where a bone cannot be mended because of the lack of the other portions. The fitting together of broken bones should always be executed with the greatest possible care so as to avoid the distortion of the original proportions.

In case of several specimens of a bone being contained in a lot, for instance the contents of a grave, mound, or another circumscribed area, I employ additional small Arabic numerals. I should

¹ See footnote on page 399.

enumerate two lower jaws found thus, as follows: 26 Md. 1, and 26 Md. 2, the anatomical abbreviation to be inclosed in brackets as usual, in case of defectiveness. If two clavicles were found with the lot, a right and a left one, but of different skeletons, their designation would also read: 16 Cl. d. 1, and 16 Cl. s. 2, when the Arabic numerals make clear their belonging to two different complexes. Arabic numerals would have to be added also in case of plurality of bones which according to anatomical nomenclature are distinguished by Roman numerals (vertebrae, costae, metacarpalia, metatarsalia, cuneiformia, and phalanges). Two atlantes of the same find would have to be marked thus: 17 V/c. I. 1, and 17 V/c. I. 2. This holds true also if in a series of bones of the same kind, for instance in the vertebrae, it is found impossible to determine their anatomical number in the special region of the vertebral column. Four thoracic vertebrae answering this condition I should designate in this way: 15 V/th. 1, 15 V/th. 2, etc.; or collectively (in the accession catalogue, see page 404): 15 V/th. 1-4. Vertebrae in complete or incomplete numbers should be strung together in their proper succession and the ends of the cord or wire securely knotted.

Samples of hair should be preserved in little well-corked glass tubes. One should not neglect to enclose with every sample a small slip of paper containing the catalogue number, race extraction, age, etc. With plaster casts or wax casts of parts of the human body alive or dead it will suffice to apply only the catalogue number while again a description should be looked for in the catalogue.

Summarizing the advice given for the designation of anthropological material, I should say:—

1. Objects in a good state of preservation receive (a) the current number, (b) the anatomical symbol, (c) the sign for right or left ("d" or "s"), and (d) the sex sign.

2. Defective objects will have their designations bracketed.

3. Additional current *capital letters of the alphabet* are applied outside the bracket in case separate parts of a broken bone are worth saving.

4. *Additional Arabic numerals* are applied in any case of *plurality or difficult* identification.

II. HOW TO DO THE MARKING

So far as the marking of the material with numbers and letters is concerned, especially in the case of bones, I should recommend a method which has stood the test in the course of my experience. The bones in an anthropological collection are as a rule devoid of their organic substances as a result of weathering or artificial maceration. They are porous and absorb liquids readily, rendering such marking illegible. To avoid this I first apply a thin solution of Canada balsam in xylol on a small area just large enough for the designation. Hereby a substantial basis for the designation in India ink is assured. However, before marking care must be taken to allow the fluid to dry thoroughly. When the ink also has dried up I apply a thin layer of a rather strong solution of celluloid (the crude colorless transparent material in sheet form or scraps) in acetone, which will dry up quite rapidly, protecting the writing henceforth from getting soiled or being blotted out by moisture.¹

A saturated solution of celluloid in acetone forms also a splendid means of gluing together portions of a broken bone. Before being fitted together in their natural shape such portions should be provided liberally with the solution just spoken of on the surfaces of the fracture and be left to dry in a spacious receptacle containing sand or seeds (millet, mustard seed, canary seed, etc.).

I seize here the opportunity of earnestly warning against fastening the teeth to their alveoli by means of glues or other strong adhesives. Teeth treated thus are utterly lost for thorough scientific investigation. In order to secure teeth that have previously fallen out, in their jaws, I use a little plastiline which will afford sufficient support to the teeth and at the same time allow of taking them out again without injury to the alveolar border. It may also be well to collect fallen out teeth in a little box or bag.

I should strongly recommend a method of placing or preserving skulls which I introduced in the collections of the anatomical institution at Heidelberg University which proved useful and is easily established. Every single skull was placed in an open low

¹ This method was originated by Dr. Theodor Mollison in the Anthropological Institute of Zurich University in 1906 and has since proved very useful.

tray. Such a tray consisted simply of a square piece of blackened plate-iron sufficiently large, with the four corners cut out squarely and the edges bent sharply upward. I did not find it necessary to have the corners soldered together as the material is strong enough to stand considerable strain in handling the trays. They cost but very little and even in large numbers the price is merely nominal.¹ Teeth fallen out of skulls that are placed on such trays will not be lost, but stay with the skull to which they belong.

III. CATALOGUING

In the technique of physical anthropological collections the establishment and working of catalogues is as indispensable as in other branches of museum work. I have worked out a device for cataloguing anthropological material, which, if realized, will satisfy both practical and scientific demands. The cataloguing will have to be divided into several distinct sections.

I. THE ACCESSION CATALOGUE

This first section might be enumerated as Catalogue AI, where the letter A stands for Anthropology.² It should be an entirely handwritten one with printed headings. Every incoming object should be registered under its number and the distinctions as suggested above be added. Under other headings should follow the symbols indicating male or female sex, anatomical designations, brief but exhaustive general descriptions, giving the coloring, approximate age, state of preservation, and finally the name of the donor, excavator, whether received in exchange, etc., together with the dates of accession. Some space should be reserved for special remarks. If skulls or their teeth-carrying parts are concerned, a formula of the teeth extant should be inserted in the description column. As the state of preservation is recorded there, every tooth will have to be quoted separately, as either present or absent. For this reason I number the teeth for either half of the jaws beginning with the middle incisors. The numbers running from 1-8 include

¹ Convenient measurements to suit any size of skulls: for the length of the tray 24 cm., width 19 cm., height 3 cm.

² See footnote on page 398.

then for every half of the jaws: two incisors (1-2); the canines (3); two premolars (4-5); three molars (6-8). Teeth wanting or not erupted I mark by an x-shaped cross; or by a continuous line in cases where all the teeth in a half jaw are wanting (see fig. 49).

Num-ber	Sex	Specimen	State of Preservation	Locality	Collector and Date of Accession	Special Remarks
3	♀ (?)	Calvarium	3Cm—Light dirty brownish; slightly defective; absence of organic substance. Mature. <i>Teeth:</i> x765432x | xx345678	Dinsmore Mound, 4 miles N. of Troy, Doniphan Co., Kansas	F. H. Sterns 1915	—

FIG. 49.—Showing the division of a page of the accession catalogue and entries under their specific headings.

Deciduous teeth might be distinguished by Roman numerals, while those showing pathological defects be bracketed.

All writings, official papers, etc., referring to a certain object should be preserved in individual, strong, large-sized envelopes. The catalogue number, as well as the date of accession, is in every case to be marked on the outside, preferably on a small extra label at the upper or lower left hand corner. Being a subsection of AI catalogue, this subsection might be referred to as AIa.

2. THE CARD CATALOGUE

This part of the catalogue designated as AII is to be worked in the sense of a library catalogue. It is meant to give information

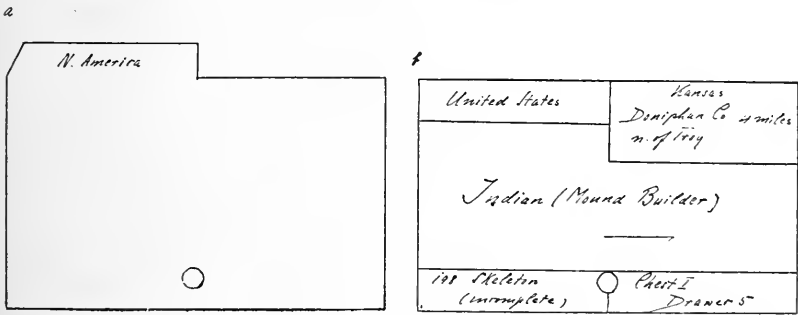


FIG. 50.—Example of a guide card (a) and a specimen card (b) of regular library card size from a card catalogue of an anthropological collection.

about geographical and racial extraction, and to locate the object. It will best be arranged according to the different parts of the earth with national subdivisions, the former to be the guide cards. On every card, representing only one number of the catalogue, either singly or collectively as the case may be, should be typewritten the nationality, locality, catalogue number of the object, this itself and the exact location in the collection (see fig. 50, *a* and *b*). It will be found advisable to write the latter remark in lead pencil so as to admit of substituting another in case of change of location. The establishment of a special skull catalogue after this device might be considered in connection with the one just described, and referred to as: AIIS (S = skull).

3. THE SCIENTIFIC CATALOGUE

As pointed out above an anthropological collection preferably bears a scientific instead of a museum character. It is for this reason a necessity to bring and keep anthropological material in such a state as to render scientific investigation possible at any time. But of still greater importance seems to me the routine-wise carrying on of such work that in every case precedes the final scientific investigation, *i. e.*, collecting the measurements and drawing diagrams. Such routine work could be done so as to satisfy the prerequisites of any school. So far as the measurements are concerned, an observation sheet similar to or exactly like that given by Rud. Martin for skull or body measurements should be employed. For diagraphical purposes I should recommend the "Kurven-systeme" by P. and Fr. Sarasin,¹ taking the contours of a skull sagittally, horizontally, and frontally at different levels. As these, however, are meant especially for securing a summary of general proportions of the skull, I have for some time employed and found quite useful, a modification of the systems under consideration, which not only serves to indicate the proportions, but can at the same time be used for measuring purposes. Of the sagittal system,

¹ Sarasin, P. and Fr. (1892-3) *Ergebnisse naturwissenschaftlicher Forschungen auf Ceylon in den Jahren 1884-1886*, Vol. 3. See also: Schlaginhaufen O. (1907) "Beschreibung und Handhabung von Rud. Martins diagraphen-technischen Apparaten," in: *Korresp.-Bl. deutsch. anthrop. Ges.*, Vol. 38, pp. 1-6.

I select the medial curve, without doubt the most useful for taking direct as well as angle measurements. An innovation of mine consists in projecting into the median-sagittal diagram, the measuring points of the orbital width and length. Thus the recession of the fronto-sphenoid process of the zygomaticum or the frontal declination of the horizontal orbital axis can be ascertained by measuring the exact distance on the cranial plane of the two verticals on the

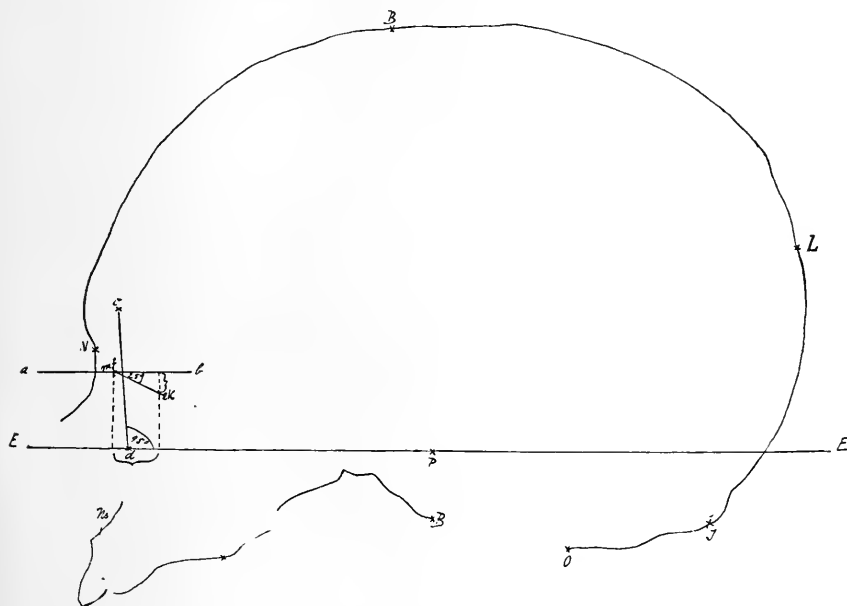


FIG. 51.—Median-sagittal diagram of a skull with orbital measuring points projected into it. $E-E$ = ear-eye plane; $a-b$ = coördinate of ear-eye plane through maxillofrontale; $c-d$ = vertical diameter of orbit; mf = maxillofrontale; ek = ekto-konchion; $ek-mf-b$ = angle of horizontal declination of orbital width diameter; $c-d-E$ = angle of vertical declination of orbital height diameter. The other letters indicate the well-known anthropological measuring points. Ainu (Japan) 99/1634 Am. Mus. Nat. Hist.

latter from the measuring points of the width. The so-called "frontality" of the orbit (to introduce a new term) is also shown by the behavior of the intersecting line of the orbital height, connecting its two measuring points, in its relation to the medial measuring point (maxillo-frontale) of the orbital width. In cases of pro-

nounced "frontality" it will be found to exceed this point in a forward direction. The orbital height line also forms an angle with the ear-eye plane, determining the amount of vertical declination of the orbital orifice. The amount of declination of the orbital width line to a horizontal plane through the maxillo-frontale can also be measured, either by taking the angle formed by the two projecting lines, or by measuring the exact distance between the lateral measuring point (ektokonchion) and the horizontal plane just spoken of. The latter may be the more reliable measure as the angle indicates a complex one, taking in the different determinations of horizontal and frontal declination which are liable to influence each other considerably. See figure 51, where only the measurements just mentioned are recorded. The great variety of

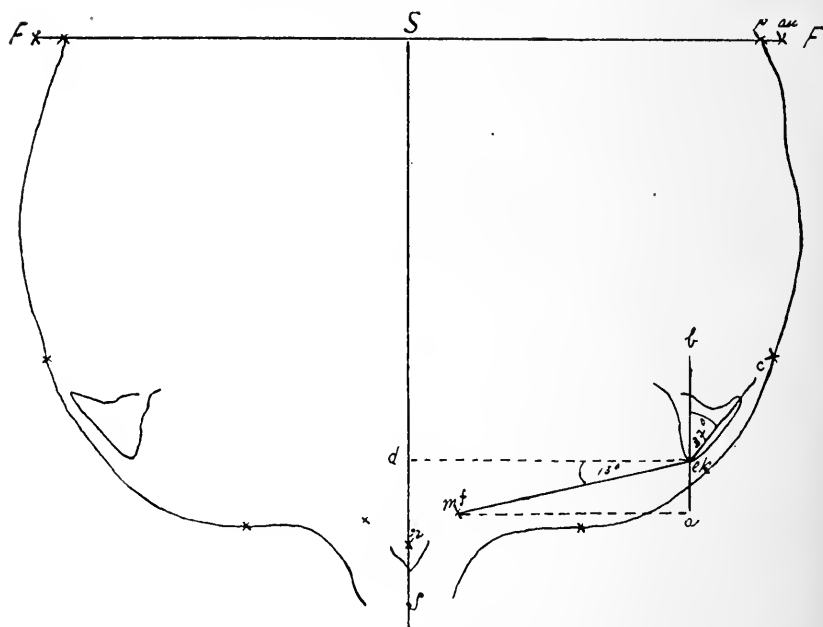


FIG. 52.—Forward half of the horizontal curve in the level of the ear-eye plane (Basalkurve). *S-S* = sagittal plane; *F-F* = frontal plane; *p* = porion; *au* = auricular; *n* = nasion; *mf* = maxillofrontale; *ek* = ektokonchion; *a-b* = coördinate to sagittal plane line through *ek*; *ek-c* = sagittal axis of frontal process of zygomatic bone at the level of the ektokonchion; *d-ek-mf* = angle of frontal declination of orbit.

measurements (direct and angular) of which the median-sagittal diagram admits are not treated there.¹

The basal curve in the level of the ear-eye plane from the horizontal system of curves will afford a good idea of the proportions of the skull in this view. Into this contour I project the position of the nasion, the measuring points of the orbital width and the outline of the nasal bones in the level of the middle of the orbital height ("Augenmitten-Horizontale"). I have found it profitable to draw the outline of the frontal process of the zygomatic bone at the height of the lateral measuring point of the orbital width (ektokonchion) because the angular position of the former to the sagittal plane can thus be easily ascertained. (See fig. 52 and legend.) Other projections of lateral dimensions might be projected into these diagrams as occasions for special investigation arise, especially that of the forward projection of the frontal process of the zygomatic bone, that of the latter itself and its lateral and

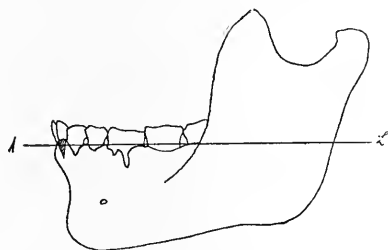


FIG. 53.—Diagram of a lower jaw. A-L = alveolar line through the lowest points of alveoli of the middle incisors and last molar, on which measurements should be orientated.

forward expansion for the investigation of which a useful method is still wanting.² Cross and other sections of other bones of the skeleton may be taken too, and this will touch upon the fundamental reason of drawing diagrams: they will furnish substitutes for exact research in the absence of the object considered. Orthog-

¹ For further reference in this respect consult: Klaatsch, H., 1909, "Kranio-morphologie und Kraniotrigonometrie." *Arch. Anthropol.*, N. S., Vol. 8, pp. 1-23.

² After the completion of this paper I became acquainted with a work by Virchow, H., 1915, "Zur anthropologischen Untersuchung des Gesichtsskelettes," *Zschr. f. Ethnol.* Vol. 47, Nos. IV, V, pp. 323-372, treating proportions and angular conditions of the face by means of an ingeniously invented instrument.

onal projections of the lower jaw, giving the outlines in profile are of importance for comparative study (see fig. 53),¹ while the principal measurements of the other bones of the skeleton will suffice to start the scientific investigation proper.

Proposals like these are entirely within the reach of the possible. It is very likely that a lack of leading principles is responsible for the little interest taken in anthropology in this part of the world, and yet, the question as to the physical habitus of the divisions of mankind that people or have peopled this continent deserves at least as much interest as the problems concerning archeology and ethnology; perhaps even more, because the physical being is the carrier of psychical manifestations. Physical investigations undoubtedly have a bearing on cultural questions and this fact establishes their indispensability.

NEW YORK CITY.

¹ For methods of investigation on the diagram of the lower jaw, see: Schoetensack, O., 1908. *Der Unterkiefer des Homo Heidelbergensis*. Leipzig; also: Puccioni, N., 1911. "Ricerche sui rapporti di grandezza tra corpore ramo ascendente nella mandibola." *Archivio Antrop.*, Vol. 41, pp. 83-152.

ON THE RELATIONSHIP OF HUAVE AND MIXE

By PAUL RADIN¹

THE Huave represent the remnant of a once powerful tribe which formerly occupied the region around the Laguna superior and Laguna inferior in the districts of Juchitán and Tehuantepec, Oaxaca, Mexico. At the present day they are confined to four pueblos, San Mateo del Mar in the district of Tehuantepec, San Dionisio del Mar, San Francisco del Mar, and Santa Maria del Mar in the district of Juchitán. A number of families are scattered through other pueblos, notably San Francisco Ixhuatán.

The linguistic affiliations of Huave have been the subject of some desultory investigation, but nothing was known of its grammar

¹ Table of sounds.

l = interdental lateral surd.

r = trilled prepalatal *r*.

l = interdental surd.

k = palatal surd.

p = labial surd.

d, *g* and *b* are the corresponding sonants of *l*, *k* and *p*.

n = *ng* in *sing*.

ç = *sh* in *she*.

x = palatal spirant with articulation approximately intermediate between the Spanish *jota* and the German *ch* in *ich*.

ʼ = palatal aspiration.

ü, *ÿ* and *ö* as described in text.

All vowels without diacritical marks are short and open, those with dot below are short and close, and those with macron are long and close. Vowels above the line form semi-diphthongs with the following vowel, but terminal *i* above the line indicates a palatal vowel.

In words quoted from Sr. Belmar's studies, I have retained his spelling, except that *sh* is generally changed to *c* and *h* to *x*. Belmar's *h* after vowels corresponds, I believe, to my *ʼ*. His vowels have their continental values.

NOTE.—The *Journal de la Société des Américanistes de Paris* had this article in type when the publication was interrupted by the war. It is hoped the Editors of that journal will not feel that their rights have been infringed upon by its appearance here.—EDITOR.

until Sr. F. Belmar made a study of it a few years ago. This he embodied in two works: a special volume entitled *Estudio de la Lengua Huave* which unfortunately I have not seen, and a section on Huave in his *Lenguas Indígenas de México; Familia Mixteco-Zapoteca*. In his summary to the section on Huave given in the latter work, Belmar rejects as insufficiently established the previous attempts to identify Huave with Nagrandan and Chiapaneco, and tries to establish an affiliation with Maya-Quiché, an idea that had been previously suggested by Orozco y Berra.

Orozco y Berra in his *Geografía de las Lenguas Mexicanas*, although he does not classify Huave linguistically makes the following remarks:—

Los Huaves son originarios de Guatemala; unos les hacen de la filiación de los peruanos fundándose en la semejanza de algunos costumbres, mientras otros les suponen hermanos de los pueblos de Nicaragua. La segunda opinión nos parece la mas acertada y aun nos atreveríamos á creer que el Huave pertenece á la familia Maya-Quiché.¹

Taking up Orozco y Berra's hint, Sr. Belmar made a detailed comparison of Huave and Maya grammar and satisfied himself that the resemblances he found, bore out the former's contention completely. I do not feel, however, that Sr. Belmar has proven his point convincingly, for his resemblances are vague and of too general a nature. If, however, we are compelled to reject his proof as inadequate, there are undoubted indications, which I hope to discuss at a future time, of a relationship between Maya-Quiché and Mixe-Zoque, which would thus establish a relationship between Maya-Quiché and Huave, if my proof of an unquestioned affiliation between the latter language and Mixe-Zoque holds.

I will quote Sr. Belmar's proof in some detail, first in order to show the nature of his method, and secondly because his work is rather difficult to obtain.²

Las comparaciones que siguen demuestran la anterior tesis (*i. e.* that Huave is related to Maya-Quiché).

Número-el número en la lengua Maya se expresa por el sufijo *ob* que significa aquellos, como:

¹ Quoted from Belmar, p. 179.

² *Idem*, pp. 183-188.

uinic, hombre.

uinic-ob, hombres.

En Quiché, *ib* como:

ca-ib, dos,

cah-ib, cuatro.

En Huave aparece igualmente como signo de plural, convertido en *uf*, *uv*, como:

ihp-euf, dos,

ar-uf, tres,

ahk-euf, ellos.

Caso.—En las lenguas del grupo Maya-Quiché existe la partícula *ti* para indicar las relaciones del nombre. Esta misma partícula aparece en Huave, como:

tsëp ti ndiok, voy al mar.

El genetivo se expresa en Maya y Huave anteponiendo al nombre de la cosa poseída el índice posesivo *u*, como:

Maya: u-zuhal Pedro, el miedo de Pedro.

Huave: u-puit Pedro, el Perro de Pedro.

Posesión.—Las partículas posesivas del Huave siguen el mismo procedimiento que en las lenguas de la familia Maya-Quiché, prefijando los índices posesivos y sufijando al nombre, los índices de plural, *ob* en Maya y *uf* en Huave, como:

Maya: ca-yum-ob, nuestros padres.

Huave: ci-tet-iuf, nuestros padres.

Conjugación.—El sistema general de conjugación se reduce á anteponer y posponer al tema verbal verbos así como partículas indicativas de tiempo y de personas, como:

nacal in cah, subo.

bín nacac en, subiré.

El Huave sigue el mismo procedimiento, como:

tingel nahieng, bailo,

tsëp nahieng, bailaré.

El origen de auxiliar *tingel* parece ser de las partículas del Maya *ti* y *cah* y la *n* epentética.

La lengua Maya conserva dos formas de conjugación; una en que los índices temporales y personales se posponen al verbo, como:

nacal in cah, subo.

y la otra en que dichos índices se anteponen al verbo, como:

ten cambezic, lo enseño.

El Huave sigue el segundo sistema, como:

na kiechi, lo enseño.

mi kiechi, lo enseñas.

El pasado es la raíz verbal determinada en Maya por los prefijos personales, y en Huave con los prefijos *tsa*, *i*, *a*. En Zotzil, el pasado se caracteriza por la partícula *ilag* que se relaciona con el índice de pasado *a*, *i*, *u*, semejantes á los del Huave *i*, *a*. El Maya y el Huave distinguen las personas por medio de los pronombres posesivos, verificándose en las segundas y terceras personas de plural la encapsulación del verbo principal ó auxiliar, de la partícula pronominal y el índice numeral, como:

Maya: nacal-a-cach-ex, vosotros subís.

Huave: mi-~~hi~~eng-er-an, bailasteis.

Verbos transitivos.—El Maya emplea la partícula *ic* para expresar los verbos transitivos, y en Huave aparece el índice *ch* con el mismo uso. El Quiché emplea *izah*, para indicar la compulsión, y en Huave se encuentra *yaak*.

Verbos frequentativos.—Ambas lenguas, el Maya y Huave emplean la reduplicación de sílabas para indicar los verbos frequentativos, como:

Maya: bacapkap, restregarse los ojos.

Huave: locloc, apedrear.

Numeración.—La numeración Huave es por decenas, contándose de uno hasta diez, de diez hasta veinte *gah*. El mismo sistema sigue el Maya hasta *lahun* diez, y de *lahun* hasta *hunkal*, veinte.

Comparaciones léxicas.

Algunas raíces persisten en las lenguas Maya-Quiché y Huave, como:

al, raíz *Maya* con la significación de *hija*, aparece en *eahol Mame* y en *kual, Huave*.

aan, sufijo de pasiva en *Maya* se reconoce en el *Huave aran*. Se emplea como índice de participio pasivo en *Maya*.

amb, raíz *Huave* con la significación *ir*, se encuentra en *binel, Maya* en *bat Zotzil*. El pasado *ibion* del *Huave* se refiere al pasado *Maya cabinon, nos fuimos*.

kir, imperativo del *Huave amb*, guarda analogía con el *Maya-Quiche lik*, que también significarse.

ca, raíz numeral que significa *dos*, se encuentra en *ca Maya*, y en *ih, ig, ik* del *Huave*.

shuup bañarse, se refiere al *Mame Chuchan*.

tishuun, camarón, se refiere al *Mame chishum*.

achuch, besar, se relaciona con el *Mame, tzuban*.

zop, humo, se relaciona con el *Mame zip*.

chuuch, mamar, se contrae al *Mame chuum*.

achul, mear, se refiere al *Mame tsal-in*.

uchiel, moler, se refiere al *Mame cheen*, y al Huasteco *tzel*.

shink, nariz al *Mam cham*.

kie, sangre, se refiere al *Mame chie*.

bi, raíz con la significación de *matar* se encuentra en *Mame bion* y en *Huave mbi*.
ha, *agua*, se encuentra en *aa*, *Quiche*; en *Mame a*; en *Huasteco iha* y *Huave*
yoof.

lei es común en *Maya* y *Huave* con la significación de *estar*.

The present study of Huave is based on a series of texts and detailed grammatical notes obtained mainly at San Dionisio del Mar and Salina Cruz from informants belonging to the former pueblo, and was undertaken as part of the field-work with which I was entrusted by the International School of American Archaeology and Ethnology in Mexico, 1912-1913. The Mixe data were obtained from Sr. Belmar's *Estudio de Ayook* and his sketch in his *Lenguas Indígenas de México*. For Zoque I have relied on Padre Sanchez's small sketch of Zoque grammar.

As far as I know, no one has ever hinted at a relationship between Huave and Mixe-Zoque. Most investigators seemed to have been convinced that the Huave came from Guatemala or Nicaragua and that consequently no resemblance was to be expected between them and their mountain neighbors. Yet even to the present day the Mixe and Huave are within striking distance of one another, a Zoque village being situated not more than fifty kilometers from the nearest Huave village, and a Mixe village not more than one hundred kilometers. The Juchitecos belonging to the Zapotecan family and differing only in negligible phonetic details from the Tehuanos, lie between the two. A cursory investigation of Huave and Mixe on the basis of material obtained at San Dionisio del Mar and Belmar's sketch, showed a number of grammatical similarities. To the points gleaned from Belmar's Mixe studies, were added a number of the most marked resemblances obtained from my Huave informant.¹

I shall discuss the Mixe-Zoque and Huave affiliations from three points of view, phonetically, lexigraphically, and grammatically. Before proceeding, it might be best to state, in order to avoid all

¹ The writer succeeded in obtaining a vocabulary and about fifty pages of Mixe tales with interlinear translation from a Mixe living in Oaxaca, Oaxaca, whose home was in Juquilla-Mixe; but at that time he had not suspected any relationship with Huave and for that reason failed to get certain forms which would have been of considerable importance for this little study.

misunderstandings, that I am leaving out all mention of the lack of correspondence of the two languages under discussion, for the latter does not in any way detract from the value of the evidence here adduced.

Phonetics.—Mixe-Zoque has all the consonants found in Huave with the exception of *l* and *r*. Both of these sounds seem however related to Mixe *t*. Zoque *t* of the second person singular corresponds undoubtedly to Huave *r* of the second person singular.

The vowel system of the two groups corresponds in all details. Both have three umlaut vowels; *ö* between *e* and *ö* in German *können*; *ü* as in German *Hütte* and *û*, "pseudo" *ü* like *ü* with lips very slightly rounded. The latter vowel appears to result from the union of a very weak *i* with an accented *u*. Both groups have a large number of diphthongs. In Huave these are of three kinds; true, "pseudo," and "glide." Belmar enumerates fourteen in Mixe-Zoque but there are unquestionably more. Huave has about twenty-five. Both languages likewise possess rearticulated vowels.

One of the marked phonetic differences of the two languages is the presence of a large number of consonantal clusters in Mixe-Zoque and their complete absence in Huave. There are, however, in Huave a number of positional clusters.

Lexigraphic.—The lexigraphic resemblances are not numerous, apparently, although I am convinced that their number will be considerably increased as soon as certain sound shifts can be established. One shift seems fairly certain, that between Mixe *tz* or *tc* and Huave *k*, to judge from the following examples:—

Mixe	Huave	English
<i>tza</i>	<i>kan</i>	stone
<i>tzo</i>	<i>ko</i>	elder brother
<i>tök</i>	<i>tetc</i>	to break
<i>tzish</i>	<i>na-kĩats</i>	black

That Mixe *t*, in some cases, goes back to Huave *l* is also probable, compare for example Mixe *at* with Huave *al*, *to be*, and Mixe *te-k* with Huave *le*, *foot*.

Owing to the great differentiation of Mixe and Zoque dialects, a good deal probably depends upon the dialect of Mixe or Zoque

with which the Huave vocabulary is compared. The Mixe vocabularies of Belmar represent the dialects spoken in the districts of Villa Alta and San Carlos (Yautepec). It is just probable that a comparison of Huave with one of the Tehuantepec-Mixe dialects would yield a larger number of cognates.

The following words seem unquestionably related:—

Mixe	Huave	English
<i>koi</i>	<i>kuoi</i>	hare
<i>maa</i>	<i>a-mēi</i>	to sleep
<i>kahpm</i>	<i>kɨambā'</i>	pueblo
<i>tzitz</i>	<i>a-tcūotc</i>	to suckle
<i>poh</i>	<i>pūp</i>	wind
<i>tec; (teit)</i> ¹	<i>tiet</i>	father
<i>tōōc (taac)</i>	<i>tā'</i>	mother
<i>netōōc</i>	<i>ntā'</i>	wife
<i>mīn</i>	<i>mīon</i>	to come
<i>ak</i>	<i>tak</i>	skin
<i>xui</i>	<i>a-ngüoi</i>	to pay
<i>xah</i>	<i>xaq</i>	to see
<i>mac</i>	<i>muc</i>	effeminate
<i>tek</i>	<i>tiuk (Belmar)</i>	
	<i>ndiok</i>	estuary
<i>uīn</i>	<i>ɨnā-k</i>	eye
<i>tzouc-k</i>	<i>a-tcutc</i>	to kiss
<i>ahk</i>	<i>a'k-üoi</i>	to be angry
<i>pōih</i>	<i>poā'</i>	flower
<i>tzoken</i>	<i>tcok</i>	ant
<i>(atzotz)</i>	<i>a-tsâts</i>	beard
<i>(unc)</i>	<i>niɨ-vendj</i>	son
<i>(nox)</i>	<i>nac; nüoc</i>	daughter
<i>xep</i>	<i>ɨ-ciɸ</i>	tomorrow
<i>kaatz</i>	<i>a-ku'etc</i>	to cut
<i>ko</i>	<i>kɨ-mīon</i>	when
<i>paa</i>	<i>u-mbei</i>	shore
<i>pīhɸ</i>	<i>pūp</i>	bladder
<i>misto</i>	<i>mitci</i>	cat ²

¹ All the words in brackets are forms given by Quintana in his *Arte de la Lengua Mixe*. I was unfortunately not able to get a copy of this work, neither the old edition, nor the reprint of the Comte de Charencey and had therefore to have recourse to Raoul de Grasserie's edition of a portion of it.

² This may be a Nahuatl loan-word.

<i>pöntk</i>	<i>püendj</i>	gentle
<i>puc</i>	<i>a-püec</i>	to cut
<i>tu-k</i>	<i>tḭ</i>	in

It will be noted that quite a number of terms of relationship are in the list.

The main points of resemblance lie, however, in the grammatical structure of the two languages, more particularly in the personal and possessive pronouns in composition (the independent show but little relationship); the tense signs; the reflexive and passive voices; the causatives; and a considerable number of prefixes and suffixes.

Personal pronouns.—The personal pronouns are the following:—

Mixe	Huave	English
<i>n-</i> , <i>c-</i>	<i>n-</i> , <i>sa-</i>	I
<i>mī-</i> , <i>īc-</i> , <i>c-</i>	<i>r</i> , <i>i-</i>	thou
<i>y-</i> , <i>t-</i>	<i>a-</i> , <i>i</i>	he
	<i>n-on</i> , ¹	I and he
	<i>a-ār</i>	I and thou
<i>n-oim</i>	<i>n-ts</i>	we
<i>m-ta</i>	<i>r</i> , <i>i</i> , <i>-on</i>	you
<i>y-ta</i>	<i>a-ōov</i>	they

There are a number of discrepancies between Mixe and Huave list of pronouns and Belmar's. First of all Belmar gives no dual forms either in Mixe or Huave. In Huave I know that they exist, and in Mixe, I strongly suspect them for I found two forms in the Juquila dialect, one consisting of the first singular *n-* and the plural suffix *t-* which is unquestionably the true first plural and another consisting of *n-* and the suffix *-ts* which to judge from my texts, is the dual inclusive. If we add to these two the *-oim* form obtained by Belmar we have three forms for the non-singular first person. To judge from Belmar's error in the interpretation of the Huave *-on* form (the exclusive dual) as the true plural, he may have made the same mistake in Mixe and thus his *-oim* may really be the exclusive dual, identical with Huave *-on*. I have no hesitancy in identifying the *m* and the *n* here, for while no such shift seems to exist between Mixe and Huave, it exists in the Huave sub-dialects,

¹ In the pueblo of San Mateo it is *n-on*. Belmar gives this as the first plural. I am placing it provisionally as exclusive dual.

San Mateo having *cikom* for the independent form of the dual exclusive and San Dionisio, *cikon*. As a matter of fact Belmar mentions three forms for the first person plural of the independent personal pronoun, *öötzaloim* on page 268 and *öötziim* and *öötzatoim* on page 266. The second discrepancy between Belmar and myself is in the Huave pronouns for the second and third singular which he gives as *mi-* and *ma-*. Here he has fallen into a curious error and interpreted the present-aorist tense element *m-* plus the true personal pronouns *i-* and *a-* as the pronouns themselves. He was probably led astray by the fact that a number of verbs always appear idiomatically with the present-aorist prefix.

The differences between the Mixe and Huave series of personal pronouns are by no means negligible, although the resemblances are quite patent too. Mixe *c* of the first singular is unquestionably the same as the Huave *sa-* for Belmar states that there is no true *s* in the dialects he is acquainted with. Mixe *ic* of the second singular may represent Huave *ik*, the independent form of the second singular. Huave *r-* hardly seems to correspond to Mixe *m-* but it is probably identical with Zoque *t-* and *tc-*, *m-* is however found as the second person in the Huave possessive pronoun for non-body parts. For the *t-* of the third singular in Mixe there is nothing comparable in Huave.

Reflexives.—Huave and Mixe express the idea of reflexivity in the same way and with the same grammatical element, Huave prefixing *ni-* and Mixe *nai*.

Huave	Mixe
<i>nierembī'</i> , you struck yourself,	<i>nai-otz</i> , I myself,
<i>nūmbū'el</i> , he burnt himself.	<i>nai-mitz</i> , thou thyself.

General nominalizer.—The Huave nominalizer *ni-* with the force of *that which*, *he who*, seems to be identical with the Mixe *-n*.

Huave	Mixe
<i>nūietaran</i> , that which is eaten.	<i>ahot-n</i> , hope (that which one hopes).
<i>nūpū'p</i> , he who hunts.	<i>hah-on</i> , flame (that which burns).

Passive voice.—In the passive voice we find the following pronominal forms:—

Huave	Mixe	English
<i>ci-</i>	<i>ic-</i>	I
<i>er-</i>	<i>m-</i>	thou
<i>i-</i>	<i>i</i>	he

The possessive pronouns.—Huave has a differentiation of the possessive pronouns which is apparently absent in Mixe. Of the two sets used in Huave, one is employed with nouns referring to body-parts and the other with all other nouns. The set used for body-parts is probably merely the modified independent personal pronouns *cik*, *ik* and *a'k*. That used for non-body parts is quite peculiar. The possessive pronouns of Mixe are the same as the personal pronouns.

The following are the Huave possessive pronouns:—

Body-parts	Other nouns	English
<i>ci-</i>	<i>ca-</i>	my
<i>i-</i>	<i>mi-</i>	thy
<i>a-</i>	<i>mi-</i> or <i>u-</i>	his

Tense elements.—There are four tenses in Huave; the indefinite, the present-aorist, the past, and the future. The indefinite has no tense element, the present-aorist prefixes *m-* to the personal pronoun. This *m-* is apparently lost before the pronoun of the first person *na-*. The past tense prefixes *t-*. For the first singular of the past tense *sa-* seems always to be used. The future tense is formed by prefixing *öp-* to the present-aorist tense form. *öp* apparently represents a broken-down auxiliary verb, for it is partially conjugated having *s-öp* for the first person, *üöp*, for the second and *öp*, for the third.

Mixe and Zoque like Huave have no tense element for the present. In the aorist it is *-p* for Mixe and *-pa* for Zoque. The past tense suffixes *-t* or *-ö*, while future suffixes *-up* or *-ut*.

It will be noted that whereas the present-aorist, past and future tense elements are prefixed in Huave, they are suffixed in Mixe-Zoque. However, I believe that these tense elements are to a certain extent independent verbal forms and that the prefixation or suffixation is of little morphological importance.

Causatives.—There are two causatives in both Huave and Mixe-Zoque, both of them likewise occurring as independent verbs.

Huave	Mixe	English
<i>γak</i>	<i>γak</i> (Sp. "hacer")	to make
<i>tü'p</i>	<i>tuk</i> (Sp. "echar")	to compel

Suffixes and prefixes.—The following suffixes and prefixes occur in both Huave and Mixe with the same meaning:—

Huave	Mixe	English
<i>a-</i>	<i>ai-</i>	before
<i>mu-</i>	<i>mo-</i>	supplication
<i>nga-</i>	<i>ka-</i>	negation
<i>mî-</i>	<i>mu-</i>	activity for another
<i>na-</i>	<i>na-</i>	aimlessness
<i>ak-</i>	<i>ak-</i>	entirety
<i>-ēi</i>	<i>ei</i>	reciprocity
<i>na-</i>	<i>-na</i>	repetition

e. g.,

Huave	Mixe
<i>a'-napī'on</i> , I foretell	<i>ai-ic</i> , foresee
<i>mu-ndī'om</i> , I ask beseechingly	<i>mo-noukc</i> , to supplicate
<i>nga-xü'ek</i> , he disappears	<i>ka-ic</i> , to despair
<i>mî-naxī'ot</i> , he works for another	<i>mu-ton</i> , to work for another
<i>na-napī'on</i> , he wanders from the subject	<i>no-yoi</i> , to walk aimlessly
<i>ak-angü'oi</i> , he pays entirely	<i>ak-xui</i> , he pays entirely
<i>na-pī'on</i> , he speaks frequently	<i>akotz-na</i> , to counsel repeatedly.
<i>apīongü'oi</i> , he converses with someone.	

A sufficiently large number of resemblances of vocabulary and grammatical detail have been given here, to make the supposition of chance of borrowing untenable so that the only alternative left, is the assumption that Huave belongs to the same linguistic stock as Mixe-Zoque.

GEOLOGICAL SURVEY,
OTTAWA, CANADA

HERMANN KLAATSCH

By BRUNO OETTEKING

HERMANN KLAATSCH, professor of anatomy and (physical) anthropology at the University of Breslau, died unexpectedly on the fifth of January, 1916. In him science loses a highly gifted representative and teacher, and those who have had closer intercourse with him an amiable personality and friend.

Klaatsch was a man who perceived with rare acuteness the meaning and object of the science of (physical) anthropology, and impressed on many of its phases the stamp of his personality. His talents found early recognition and stimulation by his family. He was born on the tenth of March, 1863, the son of a prominent physician in the city of Berlin. From a boy he showed pronounced interest in natural sciences and a lively zeal for collecting specimens. He graduated from the Royal Wilhelms-Gymnasium of his native city in March, 1881, and took up the study of medicine at Heidelberg. Here it was Gegenbaur who especially attracted him and it was to him that he became indebted for his comprehensive knowledge of descriptive and comparative anatomy. Between the university years at Heidelberg and his later courses at Berlin he spent some months of zealous study at the biological station of Villefranche near Nice. He spent his year of military service in Berlin. Here also he worked for a longer term at the Rudolf Virchow laboratory and at the Augusta hospital, and in 1885 became scientific assistant at the anatomical institute under Waldeyer. His promotion to the degree of doctor of medicine took place in 1885-86, and during this period he also passed the prescribed state examinations.

A new phase in Klaatsch's scientific activity began in 1888, when Gegenbaur invited him to come to Heidelberg. Here he began his academic teaching in 1890 and became a professor extraordinarius in 1895. During the years 1904-1907 he made his trip

to Australia to investigate the aborigines there and stopped for a short sojourn on the island of Java. After his return he accepted a call to the University of Breslau, where he taught anatomy and anthropology, undertaking in 1912 also a course in topographic anatomy. The reorganization of the anthropological and ethnological collections is also due to his endeavors. Besides his professorship at the University, Klaatsch held several honorary offices, academic and governmental, and his government honored him by bestowing upon him several orders.

Klaatsch's scientific work can clearly be divided into two periods, the line of demarcation being drawn about 1899. During the first he was chiefly interested in descriptive and comparative anatomical work, in which he gave valuable stimulation more particularly to comparative organography. As a logical sequel to this work he turned to the study of man.¹ This second period sets in with a treatise on: *Die Stellung des Menschen in der Reihe der Säugetiere, speziell der Primaten und der Modus seiner Herausbildung aus einer niederen Form*.² In this paper was already prefigured the course of all his later research. And from now on his studies were directed to primitive Hominidae in consideration of the importance of the problem of the evolution of form. Simultaneously with this transformation the discussion of the Neandertal question had reached its climax. Independently of each other, G. Schwalbe spoke about the skull of this fossil at the congress of anatomists at Bonn (1901), and Klaatsch discussed the limbs. His occupation with paleolithic man found its expression in numerous meritorious treatises. It became almost a necessity for him to study in their native habitat the aborigines of Australia, who manifestly had remained at a primitive stage of culture and development due to their geographical isolation. He therefore undertook in 1904-1907 his extended Australian exploration trip with the material aid of the Royal Prussian Academy of Sciences at Berlin. The harvest of new facts, reported in a series of papers, was extra-

¹ A list of Klaatsch's more important works containing 81 different items may be found in an article by Rich. N. Wegner, *Anatomischer Anzeiger*, 1916, Vol. 48, Nos. 23-24, pp. 619-623.

² *Globus*, 1899, Vol. 76, No. 21, pp. 329-332; No. 22, pp. 354-357.

ordinarily rich. The demonstration of pre-neandertaloid traits in the skull and skeleton of the Australian native was probably of greatest importance. Two papers of special value treating of these finds might be mentioned here: "Das Gesichtsskelet der Neandertalrasse und der Australier," 1908, *Verhandlungen der anatomischen Gesellschaft*, Vol. 22, pp. 1-51, and: "The Skull of the Australian Aboriginal," 1908, *Report Pathological Laboratory Lunacy Dept.*, Sidney, pp. 3-167. The Australian studies gave rise to a reform of his anthropological methods, adopted henceforth in all of his investigations. They are treated systematically in his work on: "Kranio-Morphologie und Kranio-Trigonometrie," 1909 *Archiv Anthropol.*, Vol. 7, No. 5, pp. 1-28. We also find them employed in the highly valued work on the Heidelberg lower jaw by its discoverer O. Schoetensack, the completion of which was greatly aided by Klaatsch's inspiring help. As a significant period in his research work follows now the unearthing and description (with O. Hauser) of the skeletal remains in southern France (1909-1910), which became generally known as *Homo mousteriensis hauseri*, and *Homo aurignacensis hauseri*. Quite a number of other investigations of old finds were recorded in the latter years of his life, during which he also produced papers which directly touched the domain of ethnology, e. g. *Die Anfänge von Kunst und Religion in der Urmenschheit*, Leipzig, 1913.

The distinctive feature of Klaatsch's scientific mission lies in his clear conception of the problems underlying and of fundamental bearing on human evolution. He tried to solve them in a way sometimes subjective and markedly original, in a way that inconsiderately shelved skepticism and doubt. As to the problem of evolution he applied the lever directly at the root, resolving the complex of closely related forms into radiating lines of special development. Klaatsch's anthropological research work was based on the most admirable insight into the nature of comparative anatomy. But besides this basis, so indispensable for anthropological research work, he was endowed with rare gifts, of which his morphological discrimination and the synthetic comprehension of morphological traits in a phylogenetic sense, were most pronounced. Klaatsch also was one of the first to advocate energetically a clear

division of religion and science. This involved taking a position against Virchow and Ranke, and revealed the firmness of his convictions. It may sometimes be difficult for us in this generation to realize that a conception of anthropology raising it to the level of an academic science dates back not even a generation, and is due to spirits of Klaatsch's type. It was a treat to listen to him when he developed his ideas in substantially built-up sentences and with his peculiarly spirited delivery. Since 1897 hardly one of the yearly congresses of anthropologists or anatomists passed at which Klaatsch did not speak. In numberless discussions he stood his ground in his decisive way of argumentation that never swayed from scientific principles. Still it was characteristic of his individuality that he later modified a keenly formulated hypothesis. If this demonstrates a critical intelligence in proportion to the importance of the subject, we have to be thankful to his initiative on the other hand for many a fundamental gain in knowledge. Klaatsch was one of those who championed the almost complete exclusion of statistical calculations, deriving his results directly from organic observations. The following approaches a scientific confession of faith, which he adhered to in all his works:—

Without a true knowledge of the morphology of *prosimiae* and *simiae* all descriptive picturings of human varieties and racial differences remain only dead material. . . . It is indeed not my intention to undervalue strictly metrical methods, but I believe that their value would acquire considerably more importance, if all such anthropometric investigations should be subordinated to the viewpoints of comparative anatomy. (Translation from *Globus*, 1899, Vol. 76, p. 355.)

Such procedure is surely responsible for the wealth of morphological details described in his writings.

Klaatsch's was an open-minded, amiable character. Whoever had the privilege of being in touch with him for a longer or shorter period is able to appreciate his inexhaustible kindness in helping and advising associates and disciples. His scientific domain resembled a well-cultivated field teeming with produce. As a human being he was free from pose and artificiality. In this obituary the present writer wishes to express his heartfelt indebtedness to both his scientific and personal character.

NEW YORK CITY.

BOOK REVIEWS

METHODS AND PRINCIPLES

Men of the Old Stone Age: Their Environment, Life and Art. HENRY FAIRFIELD OSBORN. Charles Scribner's Sons: New York, 1915. Pp. 1 to 545; 8 plates, 268 text figures, and 1 map.

It is doubtful whether any field of scientific investigation has proved itself more attractive, both to the amateur and to the trained investigator, than that including the origin and early history of the human family. Within the last decade both scientific and popular magazines of Europe have contained very many interesting, in fact startling, statements concerning recent discoveries in this field of research, but for reasons not clearly understood comparatively little on this subject has come to the general reading public of this country through our own literature. The fact that early events in human history appear to have been staged on a theatre distantly removed from America seems not sufficient to account for our failure to be interested when other aspects of history receive our closest attention. Coming at this particular time of need, Professor Osborn's most admirable presentation of the subject takes an important place in the literature of modern science available to readers with interests ranging from general history, through archeology, geology, paleontology, and all aspects of the problem of anthropology.

The story told in *Men of the Old Stone Age* had its origin in Professor Osborn's personal impressions received on a journey through the regions occupied by early homes of the people of the stone age. It had its first presentation as the Hitchcock Lectures at the University of California before a large and interested audience representing all phases of university life. The interest shown by students and faculty in this course of lectures, and the avidity with which the published volume has been brought into use by university classes, show not only that the subject is one of fundamental interest for all, but that Professor Osborn's presentation and organization of the material have given a most fascinating picture of this phase of early history.

Viewed in the light of modern science, the problem of early man is not limited to sequence of cultural and biological changes, but must include an interpretation of the environment in which the human type developed.

Many aspects of the whole problem have been considered in a wide range of publications stretching over more than half a century of important research. In certain works the emphasis has naturally been placed upon cultural development, in others upon biologic change or evolution. In an unfortunately large proportion of publications of the first group the ultimate scientific value is much reduced by insufficiency of the data required in determining chronologic succession. In the second group inadequate information as to the nature of evolutionary or paleontologic series in other mammalian groups has often diminished the value of investigations centered upon man alone. In approaching the discussion of men of the Old Stone Age, Professor Osborn frankly confesses that he is not an archeologist, and that for materials representing this phase of the study, he has drawn upon the most eminent authorities, among whom are Hugo Obermaier and Henri Breuil. The geologic succession, especially in its relation to demarcation and the length of the climatic stages, has been based to a considerable extent upon the work of Albrecht Penck, Edward Brückner, and James Geikie.

Very important features of Professor Osborn's book are the exceptionally good foundations for judgment concerning the all-important matters of chronology, and of comparative or historical sequence in skeletal characters. Professor Osborn's broadly founded and widely applied knowledge of the history of mammalian faunas of the Northern Hemisphere in Pleistocene time has given the best available basis for interpretation of chronology and for correlation in study of both cultural and biologic stages. His knowledge of the mammalian paleontologic succession, based upon extended research, has furnished an unusually good foundation for judgment as to value of characters in the human evolution series.

In the opinion of the reviewer, Professor Osborn's book shows an exceptionally good balance of the geologic, paleontologic, and archeologic aspects of the problem. The natural tendency of writers in early stages of development of this subject has been to emphasize special phases, and the value of much important literature has been considerably reduced by failure to correlate the data obtained with that from other fields. We are still far from the stage at which we may assume to put into their true relations to each other the materials representing all aspects of the subject from all geographic stations and from all geologic stages, but great advances have been made in the simplification and interpretation of these records. Professor Osborn's book well represents the present development of the most advanced research, both with reference to

extent of material and to correlation and simplification of the essential or significant facts.

With reference to detail of the text of Professor Osborn's book, the author is to be complimented on such excellent organization of the material that it reads as a connected story, and is at the same time most useful for reference on the whole subject of early man.

Concerning the consecutive items of the story of man as set forth in this volume, and especially regarding those parts relating to the least satisfactorily known materials, the writer desires only to express the conviction that the author's views reflect most satisfactorily the trend of thought among investigators most closely in touch with the problems involved. Where vital differences of opinion exist the evidence is presented in such form that the facts are all available. Nothing is more true than that many items in the story of early man are not as yet interpreted to our satisfaction. The book is yet to be published in which every detail satisfies every measurement, but every book is judged on the merit of its contribution or organization of materials needed for the thought of investigators, students, and general readers. Though certain of the materials used by Professor Osborn may be modified to some extent by continued research, the method of treatment and the nature of organization of the subject are such that the book may well continue for a long period as a standard for reference concerning the development of this aspect of scientific work up to the present time.

To the student, either professional or amateur, it must always be true that a word picture, no matter how skilfully executed, can never completely replace the actual visualization of natural objects described. In this respect too great praise cannot be bestowed upon Professor Osborn's volume for the nature, arrangement, and exceptional clearness of the illustrative materials. Maps giving the location of important stations and illustrating changes in geologic history, diagrams showing cross-sections of significant deposits, careful drawings representing important skeletal materials, reconstructions of typical representatives of various faunal stages, and numerous reproductions illustrating the implements and art of primitive man have all contributed to make the perusal of this volume the nearest approach to a journey through the land of Men of the Old Stone Age, and through the museums in which the most interesting remains are now preserved. The book has also been provided with numerous tabulations and diagrams representing sequence of faunas, cultures, and geologic changes. These all assist greatly in reducing the abundant data to their simplest and most significant elements.

The final test of any book is its influence upon the readers who consider it with open mind. The members of the University of California have been particularly fortunate in being the first to hear the message conveyed in this interesting work, and also the first to make large use of the materials in University studies ranging through elementary classes to faculty seminars, and representing a wide variety of subjects related in one direction or another to the problem of history included in the story of early man. The influence of the lectures in their first presentation, and later that of the published volume, which reached an even larger audience than the lectures, has left no room for doubt concerning the interest in this subject presented in the form in which it has been given to us by Professor Osborn. It is well within the limits of conservatism to state that in this particular country no one of the several works in various languages available to us up to the present time has given such an impetus to the study of early human history as has been furnished by *Men of the Old Stone Age*. In the opinion of the reviewer, this field of study will generally be found one of the most attractive aspects of science and of history. We have needed only a statement of the case such as has been given us by Professor Osborn to make possible a larger and better understanding of the subject on the part of the great group of American readers and students, who have normally the deepest interest in all fundamental problems touching man and his environment.

JOHN C. MERRIAM

The Inequality of Human Races. ARTHUR DE GOBINEAU. Translated by ADRIAN COLLINS, M. A. Introduction by Dr. OSCAR LEVY, Editor of the Authorized English Version of Nietzsche's Works. New York: G. P. Putnam's Sons, 1915. Pp. 218.

At the time of its first appearance this work may have had some pretensions to the term scientific, but the rapid advancement of all branches of anthropology has deprived it today of any such claim. Its reappearance must be viewed as smacking strongly of that pestiferous reactionary propaganda to which the present war has given birth. The author's thesis is that there are three fundamental races of man—white, yellow, and black—and that all others are hybrids, resulting from mixtures between these three in varying proportions. The same three races have the relative value indicated by the order given, and the Aryan branch of the white race is above all. The great cultures among mankind have been initiated by white peoples, and when these cultures have fallen it is because the original stock has become impure through mixture

with the others. "If there is any element of life in these ten civilizations [the Indian, Egyptian, Assyrian, Greek, Chinese, Roman, Germanic, Alleghanian, *i. e.*, the culture of the "Mound Builders," Mexican, and Peruvian] that is not due to the impulse of the white races, any seed of death that does not come from the inferior stocks that mingled with them, then the whole theory on which this book rests is false." The "ten civilizations" are fully discussed in the original work of which the present translation forms the introduction, but it will not be necessary for us to wade through them in order to test the truth of the contention which forms the basis of the undertaking. "The whole theory on which this book rests" has been sufficiently refuted by later ethnologists, and any argument at this time would be superfluous.

From our author's dedication it appears that the work first appeared in 1854, *i. e.*, in the period of reaction following upon the failure of the revolutionary uprisings of 1848-9, and after the *coup d'état* of 1851. With this fact in mind the animus behind it is sufficiently apparent. Whether it was written "with intention" or not, it is to all intents and purposes an attempted justification of privileged classes from a scientific point of view. For if the white element in every culture has given it its impulse and if nations are weak or strong in proportion to hybridization, it follows as a natural consequence that the white elements within each nation are the strong ones, those best fitted to govern. In fact, these elements, in accordance with the author's theory, are bound to govern, and hence the nobility exists because it *does* belong to the superior race, and for the same reason it has a right to its position. The author is perfectly aware of the implications of his theory. He devotes some space to a consideration of the population of France, five-eighths of which he finds opposed to the ruling class and taking no part in its civilization. In a note on page 149 he quotes approvingly the following passage from Carus, "The greatest possible diversity (*i. e.*, inequality) of the parts, together with the most complete unity of the whole, is clearly, in every sphere, the standard of the highest perfection of an organism," and he deduces from it that "in the political world this is the state of a society where the governing classes are racially quite distinct from the masses, while being themselves carefully organized into a strict hierarchy." Extended comment is superfluous; we observe that "divine right," whether of kings, nobles, or property, is seldom maintained with so much enthusiasm as by kings, nobles, and owners of property, and this production of Count Arthur de Gobineau appears to be a case in point. By some Polynesian islanders it is claimed that the nobles alone have

souls, and it would not be difficult to guess with which class such a belief originated.

JOHN R. SWANTON

NORTH AMERICA

The Constitution of the Five Nations. ARTHUR C. PARKER. Albany: The University of the State of New York, 1916 (New York State Museum Bulletin, No. 184). 158 pp. and map.

Mr. Parker's latest contribution to Iroquoian ethnology comprises two principal documents and a number of minor sketches. Of these a brief version of the Hiawatha tradition (pp. 114-119) and the Appendix A: The Passamaquoddy Wampum Records (pp. 119-126) are of some interest. The Appendices B, C and D, on the other hand, contain material, in part previously published, of so superficial and fragmentary a character that the printing or reprinting of it could hardly be regarded as justifiable. The subjects are: Sketches of an Indian Council, 1846 (pp. 126-133); Minutes of the Six Nations Council of 1839 (pp. 133-144); and Minutes of the Council of the Six Nations, upon the Cattaraugus Reservation (pp. 144-152). There is finally an Appendix E, an extract from Mr. Parker's valuable article in the *American Anthropologist* (Vol. 14, No. 4, 1912) on "Certain Iroquois Tree Myths and Symbols."

The two principal sections of the work are of very considerable interest. They constitute what Mr. Parker calls "*The Constitution of the Five Nations*" or "*The Iroquois Book of the Great Law*," and are based on two manuscripts found by Mr. Parker in the Six Nations Reservation, Ontario, Canada, in 1910. The first manuscript was prepared by Seth Newhouse, a Mohawk (to be referred to as MS. 1), the second was compiled by some of the representative chiefs of the Six Nations Council, in 1900 (to be referred to as MS. 2). MS. 1 comprises an enumeration of the "Confederate Iroquois Laws" somewhat incoherently intertwined with a version of the Deganawida legend. MS. 2 gives the fullest version of the legend recorded to date.

One notes with surprise the absence of reference to previous appearance in print of MS. 2. On May 16, 1911, Mr. Duncan C. Scott presented the identical account to the Royal Society of Canada. The legend, entitled "Traditional History of the Confederacy of the Six Nations," appeared in the *Transactions of the Society*, Third Series (1911), Vol. 5, Section 2, pp. 195-246. The two publications, Mr. Scott's and Mr. Parker's, seem to be identical in all respects except that in Mr. Scott's publication an account of the ceremony called "At the Wood's

Edge" is given, which is taken from Hale's *Iroquois Book of Rites*. As Mr. Scott's publication could not have escaped the notice of Mr. Parker, the absence of any reference must be due to a regrettable oversight.

A comparison of MS. 1 and MS. 2 brings out some interesting points. With reference to the election of a new chief MS. 2 reads:—

Then Deganawideh further said: "I now transfer and set over *to the women*¹ who have the lordships' title vested in them, that they shall in the future have the power to appoint the successors from time to time to fill vacancies caused by death or removals from whatever cause" (p. 97).

The statement in MS. 1 is much more explicit. We read:—

When a Lordship title becomes vacant through death or other cause, the Royaneh women of the clan in which the title is hereditary shall hold a council and shall choose one from among their sons to fill the office made vacant. Such a candidate shall not be the father of any Confederate Lord. If the choice is unanimous the name is referred to *the men relatives of the clan*. *If they should disapprove* it shall be their duty to *select a candidate from among their own number*. If then *the men and women are unable to decide* which of the two candidates shall be named, then the matter shall be referred to the Confederate Lords in the clan. They shall decide which candidate shall be named. *If the men and the women* agree to a candidate his name shall be referred to the sister clans for confirmation. If the sister clans confirm the choice, they shall refer their action to their Confederate Lords who shall ratify the choice and present it to their cousin Lords, and if the cousin Lords confirm the name then the candidate shall be installed by the proper ceremony for the conferring of Lordship titles (p. 44).

We note then that whereas in MS. 2 the matter of electing a new chief is simply referred to the women of the proper clan and maternal family,² in MS. 1 the men of the clan are introduced; they must ratify in any case, and they may have to select a candidate from among themselves. Provision is also made in MS. 1 for various possibilities of disagreement.

There is a difference also between the two MSS. with reference to the deposition of a chief. MS. 2 reads:—

If a Lord is guilty of unwarrantably opposing the object of decisions of the Council and in that his own erroneous will in these matters be carried out, he shall be approached and admonished *by the chief matron of his family and clan* to desist from such evil practices and she shall urge him to come back and act in harmony with his brother lords.

¹ This and subsequent italics are mine.

² While the old version of the Deganawida legend does not say any more than that, it has of course been a matter of well-known practice to refer the women's candidate for ratification first to the chiefs of the sister clans of the tribe, then to those of the cousin clans, and finally to the chiefs of the confederacy in general session.

If the lord refuses to comply with the request of the chief matron of his family and clan and still persists in his evil practices of unwarrantably opposing his brother lords, then *a warrior of his family and clan* will also approach him and admonish him to desist from pursuing his evil course.

If the lord still refuses to listen and obey, then *the chief matron and warrior* shall go together to the [chief?] warrior and they shall inform him that they have admonished their lord and he refused to obey. Then *the chief warrior* will arise and go there to the lord and will say to him: "Your nephew and niece have admonished you to desist from your evil course, and you have refused to obey." Then the chief warrior will say: "I will now admonish you for the last time and if you continue to resist, refuse to accede and disobey this request, then your duties as lord of our family and clan will cease, and I shall take the deer's horns from off your head, and with a broad-edged stone axe I shall cut down the tree" (meaning that he shall be deposed from his position as lord or chief of the confederacy). Then, if the lord merits dismissal, *the chief warrior shall hand back the deer's horns* (the emblem of power) of the deposed lord *to the chief matron* of the family or clan.

Whenever it occurs that a lord is thus deposed, then *the chief matron shall select and appoint another warrior* of her family or clan and crown him with the deer's horns and *thus a new lord shall be created in the place of the one deposed* (pp. 106-7).

The corresponding section in MS. 1 differs appreciably:—

If at any time it shall be manifest that a Confederate Lord has not in mind the welfare of the people or disobeys the rules of this Great Law, *the men or the women of the Confederacy, or both jointly*, shall come to the Council and upbraid the erring Lord through his War Chief. If the complaint of the people through the War Chief is not heeded the first time it shall be uttered again and then if no attention is given a third complaint and warning shall be given. If the Lord is still contumacious the matter shall go to the *council of War Chiefs*. *The War Chiefs* shall then divest the erring Lord of his title by order of *the women* in whom the titleship is vested. When the Lord is deposed *the women* shall notify the Confederate Lords through their War Chief, and the Confederate Lords shall sanction the act. *The women* will then select another of their sons as a candidate and the Lords shall elect him. Then shall the chosen one be installed by *the Installation Ceremony* (p. 34).

Thus whereas in MS. 2 the matron, a warrior, and the warrior chief, are the only actors; in MS. 1 there is no reference to the matron as such, instead we find the men and women of the Confederacy, the women of the clan, and a council of war chiefs. Moreover, whereas in MS. 1 the new appointee, having been duly ratified by the chiefs, is installed in the regular ceremonial fashion; the matron of MS. 2 is the sole agent in this connection: the man she selects in place of the deposed chief, becomes chief without the usual ceremonials.

In addition to this, MS. 1 contains an important provision to which there is no parallel in MS. 2:—

In case *a part or all the Lords pursue a course not vouched for by the people* and heed not the third warning of their women relatives, then the matron shall be taken to *the General Council of the women of the Five Nations*. If the Lords notified and warned three times fail to heed, then the case falls into the hands of *the men of the Five Nations*. The War Chiefs shall then, by right of such power and authority, enter the open council to warn the Lord or Lords to return from their wrong course. If the Lords heed the warning they shall say, "we will reply to-morrow." If then an answer is returned in favor of justice and in accord with this Great Law, then the Lords shall individually pledge themselves again by again furnishing the necessary shells for the pledge. Then shall the War Chief or Chiefs exhort the Lords urging them to be just and true.

Should it happen that the Lords refuse to heed the third warning, then two courses are open: *either the men may decide in their council to depose the Lord or Lords or to club them to death with war clubs*. Should they in their council decide to take the first course the War Chief shall address the Lord or Lords, saying: "Since you the Lords of the Five Nations have refused to return to the procedure of the Constitution, we now declare your seats vacant, we take off your horns, the token of your Lordship, and others shall be chosen and installed in your seats therefore vacate your seats."

Should the men in their council adopt the second course, the War Chief shall order his men to enter the council, to take positions beside the Lords, sitting between them wherever possible. When this is accomplished the War Chief holding in his outstretched hand a bunch of black wampum strings shall say to the erring Lords: "So now, Lords of the Five United Nations, harken to these last words from your men. You have not heeded the warnings of the women relatives, you have not heeded the warnings of the General Council of women and you have not heeded the warnings of the men of the nations, all urging you to return to the right course of action. Since you are determined to resist and to withhold justice from your people there is only one course for us to adopt." At this point the War Chief shall let drop the bunch of black wampum and the men shall spring to their feet and club the erring Lords to death. Any erring Lord may submit before the War Chief lets fall the black wampum. Then his execution is withheld (pp. 46-7).

In this passage the startling assumption is made that part or even all of the chiefs may prove unfaithful to the principles of the League; a new body, the General Council of the women of the Five Nations, is introduced; the men again figure prominently; while the war chief is invested with powers, derived from the authority of the men, which seem to run counter both to the letter and the spirit of the Iroquois League as portrayed in MS. 2.

If a lord is found guilty of wilful murder, [according to MS. 2] he shall be deposed without the warning (as shall be provided for later on) by *the lords of*

the confederacy, and his horns (emblem of power) shall be handed back to *the chief matron of his family and clan* (p. 106).

MS. 1, on the other hand, decrees that:—

If a Lord of the Confederacy of the Five Nations should commit murder *the other Lords of the Nation* shall assemble at the place where the corpse lies and prepare to depose the criminal Lord. If it is impossible to meet at the scene of the crime the Lords shall discuss the matter at the next *Council of their nation* and request their War Chief to depose the Lord guilty of crime, to "*bury*" his *women relatives and to transfer the Lordship title to a sister family* (p. 35).

Thus the punishment of the chief is in MS. 2 a confederate function, in MS. 1 a tribal or national one; moreover, whereas in MS. 2 the guilty chief alone suffers, according to MS. 1 the entire maternal family is involved, and the chieftainship is transferred to another family.

There is, finally, still another provision in MS. 1 to which no parallel can be found in MS. 2:—

If any of the Royaneh women, heirs of a titleship, shall wilfully withhold a Lordship or other title and refuse to bestow it, or if such heirs abandon, forsake or despise their heritage, then shall such women be deemed buried and their family extinct. The titleship shall then revert to a sister family or clan upon application and complaint. The Lords of the Confederacy shall elect the family or clan which shall in future hold the title (p. 43).

Here MS. 1 provides for a contingency which has not been foreseen by the framers of MS. 2.

The main features, then, which differentiate MS. 1 from MS. 2 are these: (1) The family matron does not appear as a leading figure; (2) the men of the clan and League participate directly in the election and deposition of chiefs; and (3) in certain instances the supreme authority rests with the men; (4) the authority of the War Chiefs is great and their functions all important; (5) there is less hesitancy about depriving a maternal family of its hereditary chieftainship; (6) various instances of disagreement, faithlessness to the League and neglect of duty are guarded against; (7) certain statements reflect confused social conditions, such, for instance, as the vague reference to "the men and the women of the Confederacy"; (8) murder, finally, is treated with greater severity.

An analysis of the above features can leave no doubt that MS. 1 reflects Iroquois society at a much later stage in its development than is the case in MS. 2. The impression, in fact, derived from a study of MS. 1 is one of ancient Iroquois society distorted by abnormal social conditions and the intrusion of modern traits. This, of course, does not in any way detract from the value of the document, which, in fact, becomes of

peculiar interest as material for a study of the breakdown of a highly complex and coherent socio-political system, under the stress of modern conditions. It must be kept in mind, however, that whereas MS. 2 represents an exceedingly old traditional record, but weakly rationalized by the intrusion of later interpretations and additions; MS. 1, as an integral code, cannot justly be regarded as a genuine native product. It is, without doubt, based on a wide acquaintance, on the part of the compiler, with the beliefs, attitudes, and practices of the confederated Iroquois, but this native material has been welded into a highly formal and rationalized document, the product of a sophisticated mind, and, as such, conspicuously un-Indian in character. In a sense, then, "The Constitution of the Five Nations" is a figment. It does not exist. For, apart from the Legend of Deganawida, the Indians of the Iroquois League had no constitution, either written or unwritten.

A. A. GOLDENWEISER

AFRICA

Ethnographisch Album van het Stroomgebied van den Congo. Onder medewerking van Dr. J. MARQUART begonnen en grootendeels afgewerkt door wijlen Dr. J. D. E. SCHMELTZ, voltooid door Dr. J. P. B. DE JOSSELIN DE JONG. (Publicatien van's Rijks Ethnographisch Museum, Serie II, No. 2, pls. 200-242.) 's-Gravenhage: Martinus Nijhoff, 1916.

The reader need not be deterred by the Dutch title from consulting this work, for the explanatory legends are accompanied by English translations. The present instalment concludes the album illustrating the Congo material in the State Museum of Ethnography, various vicissitudes of fortune having delayed its completion since the earlier issue of 1904. Among the objects figured are fetiches, masks, axes, knives, articles of clothing, goblets and other carvings. The text furnishes a faithful objective description; additional data illuminating, say, the specific use of masks or fetiches were evidently not furnished by the collectors.

Only one criticism can be advanced against the manner, otherwise exemplary, in which Dr. Josselin de Jong has acquitted himself of his task: except for a fair number of Kasai pieces and a few other specimens we are left quite in the dark as to the provenance of the objects pictured. This is doubtless due primarily to the collectors' negligence. Nevertheless the Congo is so immense an area that the professional ethnographer's purposes are no longer served by a statement, without further specification, that such and such a piece comes from the Congo. With the aid of the publications of the Tervueren Museum and other sources of information, such as Sir Harry Johnston's work, it ought to be possible

to assign a probable place of origin to at least some of the specimens in the present album; and such statements, made with proper reservations, would be of great aid to the reader. For example, the reviewer would venture to guess that the fetiches with exaggeratedly up-turned noses in plate 216, figs. 3 and 4, come from the Kwango region.

ROBERT H. LOWIE

MISCELLANEOUS

Spencer Fullerton Baird. A biography including selections from his correspondence with Audubon, Agassiz, Dana, and others. WILLIAM HEALEY DALL, A.M., D.Sc. Philadelphia: J. B. Lippincott Co., 1915. XVI, 462 p. 19 plates. 8°.

Spencer Fullerton Baird holds a commanding place in the history of American science. Endowed with remarkable natural gifts, he was fortunate also in the time in which he lived. Those were days of great beginnings in American science, when some of the most important of our scientific institutions were being established, or were passing through their formative period. And it fell to the lot of Baird to play an important rôle in these affairs. Thus, he became Secretary of the Smithsonian Institution at a time when hardly more than its foundations had been laid—by Joseph Henry, the first Secretary—and it was he who largely mapped out the course, especially in connection with the National Museum, which has been followed to this day. He organized the United States Fish Commission, and served as its first Commissioner. And, what is of particular interest to readers of this journal, it was he who established the Bureau of North American Ethnology, and appointed Major Powell as its first head.

At the time of Baird's death his correspondence and other papers passed into the hands of his daughter and only child, who to the end of her life cherished the hope of writing a biography of her father. She actually did prepare some manuscript, chiefly reminiscences; but she was prevented from completing the work, first by the illness of her mother and then by her own poor health. On her death all the Baird papers, including Miss Baird's manuscript and notes, were entrusted to Dr. W. H. Dall of the U. S. National Museum to prepare a biography. Dr. Dall had been associated with Baird at the Museum for a quarter of a century, knew him intimately, and was thus splendidly qualified to prepare the work. And he has acquitted himself of the task most admirably. The life of Baird before us gives a splendid picture of Baird the man, and of his many-sided scientific interests and activities.

The volume is made up of letters, with just enough additional matter (for which some of Miss Baird's manuscript was used), to connect them

into a continuous story, or to fill gaps not sufficiently accounted for by the correspondence. Not only are letters by Baird himself reproduced, but also—and in even larger number—letters addressed to him. In the list of his correspondents are such names as those of Audubon, Louis Agassiz, Joseph Henry, Dana, Leidy and Elliott Coues.

Like all works composed of personal correspondence the volume has a peculiarly fascinating personal note about it. It gives us a glimpse into the intimate thought of the scientific men of that period that could be gotten in no other way. It illumines for us, also, the conditions affecting scientific work in America in the two or three decades immediately preceding and following the civil war.

Among his other rare qualities, Baird had a genius for friendship; and the story of the encouragement, inspiration, and help which he gave to George Brown Goode, his collaborator and successor in the administration of the National Museum, is an interesting one indeed. Such generous and unselfish encouragement given by an older to a younger co-worker is unhappily very rare indeed.

All in all, the volume gives an admirable picture of Baird, and it also throws a valuable side-light on the condition of science in his day. It ought to find a place in every serious library.

The volume is illustrated by nineteen plates,—portraits of Baird at different ages, of Mrs. Baird, and of men and places which played a prominent part in his life. These greatly enhance the interest and value of the work.

LOUIS HUSSAKOF

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DISCUSSION AND CORRESPONDENCE

A NOTE ON THE GLENOID FOSSA

THE glenoid fossae are depressions on the basal portion of the temporal bones of the skull. They furnish articular surfaces for the condylar processes of the mandible. If the mandible be considered a lever, these fossae furnish the points of resistance for the fulcrum. Since the textbooks on anatomy agree in the description of the glenoid fossa, its form might be presumed to offer little variation.

Topinard¹ suggests that a complete description of the skull should include the biglenoid diameter, especially since this would furnish the value of the intercondylar width of the mandible.

In 1915 Mr. Francis Knowles published a paper on the Glenoid Fossa in Eskimo skulls² in which he pointed out the racial value of this feature. In simia it is shallow, in human, deep. In the Eskimo the fossa is of intermediate depth. This shallowness of the fossa in Eskimo skulls he attributes to the extensive use of the mandible in the chewing of raw flesh for food and of hides preparatory to the tanning. A side to side movement of the jaws such as we have in the simia would help to account for this. Mr. Knowles believes this side to side movement in chewing is indicated by the wearing down of the molars, which has proceeded much further on the inner than on the outer surfaces.³

If we are to believe Cabibbe⁴ there is considerable variation in the posterior margin of the fossa, the posterior *eminencia articularis* of

¹ *D'Elements d'Anthropologie Generale*, 697.

² *Anthropological Series of the Canadian Geological Survey*, No. 4, Ottawa, 1915.

³ May not this unequal depression of the surface of the molar be due to greater use of the inner surfaces, the food more frequently resting there than on the outer? This would tend to pull the molars inward, a result frequently found in the Eskimo skulls. The Indian skulls from the shellmounds around San Francisco bay show this wearing down of the inner surfaces of molars and the turning inward of these teeth. But the glenoid fossa is deep, and the surface area identical with that of the condyle, so that no indication of lateral movement is to be found at this point. The presence of particles of shell in the food of these Indians would account for this unequal wearing down of the teeth, if they came into contact with the inner upper surfaces more frequently than with the outer.

⁴ Il pro esso postglenoideo nei cranii di normali, alienati, criminali in rapporto a quello dei varii ordini di mammiferi, *Anatomischer Anzeiger*, Sept. 1901, Vol. 20, pp. 81-96.

English anatomists. Criminals—especially thieves—are said to possess a downward extending tubercle on the external lateral margin about midway between the posterior and anterior margins of the fossa. This downward extending tubercle, like a slowly forming stalactite, is seen also in the feeble-minded, though there it is less developed. In the skulls of imbeciles there is often found, back of the point where this tubercle occurs, a notch or sulcus anterior to the auditory bulla. Dr. Cabibbe has not suggested an explanation of these anomalies in the skulls of criminals and lunatics and we can surmise none.

Mr. Knowles' assumption that muscular or mechanical forces may exert considerable influence on the form of the glenoid fossa is further confirmed by the effect of acromegaly upon its conformation. In 1890 Mr. H. A. Thomson published in the *Journal of Anatomy and Physiology* a description of acromegaly which pertains in part to changes in the glenoid fossa due to excessive mandibular development. The hypertrophy, in the specimen in question, not only affected almost every important facial feature but transformed the lower jaw in a most remarkable manner. It had grown until it had attained a forward projection so great that the lower incisors articulated anteriorly to the upper, thus demanding such an increased muscular pull, along with the larger leverage, as that to which Mr. Knowles calls our attention. Associated with this forward jaw are large condyles and a glenoid fossa nearly circular rather than, as we normally find, markedly transverse in area. The interest in the shape lies in the fact that it seems to have been attained by a wearing down of the anterior margin, the *eminentia articularis*.

This is similar to the change that occurs on the margin of joint-sockets elsewhere in the body when we have an enlargement of the articulating epiphyses or condyles; for example, in the lower border of the femur and the upper border of the tibia; in the lower border of the tibia and the upper surfaces of the astragalus. In the latter instances, however, we generally find the articular surfaces smooth and polished, while in the specimen described by Thomson the floor of the cavity is irregular and rough and we find no trace of new bone in its immediate neighborhood. The change in the glenoid fossa seems, therefore, not attributable to new bony structure; and, not being osteophytic, appears to be the result of mechanical forces, associated with the unusually massive and prominent jaw, and the corresponding lengthening of the leverage. The condyles showed marked increase in transverse diameter and were, moreover, directed forwards and inwards towards the mesial

plane of the head—an orientation that would further tend to diminish the elevation of the *eminentia articularis* and give circular form to the glenoid fossa.

Acromegaly is comparatively a recent investigation in anatomy, and, though the literature has grown apace in the last two decades, we have failed to find whether or not the changes recorded by Thomson are usual.¹

Neither, so far as we can learn, has anyone taken the trouble to test the correctness of Topinard's assumption that the biglenoid diameter is identical with the bicondylar diameter. Our observation of a large number of California Indian skulls, showing signs of considerable muscular mandibular pull, seemed to confirm Topinard's observation, and measurements demonstrated its correctness. With Europeans also, the inner and outer diameters of the condyles correspond respectively to the inner and outer diameters of the glenoid fossa in the specimens which we have measured.

A glance at the skulls of simia show, however, that Topinard's assumption, which, by him, is not applied to any but human skulls, is not true of the anthropoids. This disparity in simia seems to hold irrespective of age, though possibly generally more marked in adults than in the young. The Orang, however, may be an exception, for the disparity may be greater in the young of this species than in adults.

Thus, in an adult gorilla, and in a baboon with canines and third molars appearing, the condyles do not cover the entire glenoid cavity, leaving uncovered portions of both outer and inner surfaces. In a young Orang having the milk teeth, and with sagittal, frontal, parietal, and lamboid sutures still open, there is a similar failure of the condylar surfaces to overlie the glenoid. In the last mentioned an *eminentia articularis* is scarcely observable, while in the former two the fossae are very shallow.

The difference between the articulation of the condyles with the glenoid fossae in human skulls and in those of simia may perhaps best be stated in this way: looking down the outer lateral border of the ascending ramus with the mandible in position and the skull held at arm's length, the glenoid fossa is, in the human, hidden by the condyle, while in the simia it is observable. If, with the skull in this position, we look along the inner line of the ascending ramus, the same differences hold.

¹ Sollas insists that we must infer distortion in a skull where the condyles fall about ten mm. in front of the glenoid cavities, if the jaw is so placed that upper and lower incisors meet. Presumably he means posthumous distortion. (*Ancient Hunters*, 203-4.)

As such differences are best expressed in measurements we may offer the following results¹ in the accompanying table.

TABLE

	Outer Condy- lar Diam- eter	Inner Condy- lar	Outer Glenoid Fossa	Inner Glenoid Fossa
Baboon (<i>Papio porcarius</i>) (adult).....	98.5	53	103	40?
" (Last molar appearing).....	89	55	93	52
Gibbon (<i>Hylobates mullerii</i>).....	49	33.5	49	33.5
<i>Simia satyrus</i>				
(Last molars appearing).....	87	58	88	56
" " " (adult).....	128	67	132	65
" " " (adult).....	114	61	118	60
Gorilla (adult).....	135	66	138	70
" (adult).....	120	68	124	66
Eskimo (adult).....	122	82	123	81
" (adult).....	114	73	115	72
" (young) (second molar appearing).....	87.5	62.5	94?	62
" (adult)(third molar unerupted).....	98	70	104?	71

A series of eighteen Orang skulls (male and female) give an average difference of two mm. in the articular surfaces of the glenoid fossa and the condyloid processes in favor of the former. A series of seventeen Eskimo, of which the two quoted are type specimens, give an average difference of one mm., showing that they stand intermediate between the Simiidae and the European, for in the latter the condyle completely covers the fossa. It is interesting to note that the Gibbon measured stands in this respect with the European rather than with the other Simiidae, or the primitive Eskimo. A series of twenty-seven Eskimo skulls from Point Barrow examined as to the shallowness of the glenoid fossa (see Knowles' drawing), gives twelve shallow, twelve medium, three deep, showing that there is considerable variation. The young skulls exhibit the shallowest fossa, giving an extreme outer measurement (see above).

The post-glenoid margin is little developed in insects, more in the herbivorous animals, and most of all, among mammals, in the carnivorous and omnivorous. In the non-ruminants it is absent (wild boar), or but slightly marked (domestic pig). Ruminants show it slightly (giraffe), or markedly (Bovidi). Among the carnivora it is most prominent in

¹ It is often difficult to determine the exact location of the inner margin of the fossa, as this frequently slopes off most gradually into the adjoining bony surface, there being scarcely a perceptible line of demarcation.

the bear, the hyena, and the lion. In marsupials it is present but is only slightly developed.¹

The exact relation of the form of the fossa to the pressure and movement of the condyle can be determined only after further study. Duckworth² insists that the shallowness of the glenoid fossa in the gorilla and in *Hylobates mülleri* is not related to the free lateral movements of the mandible in mastication. "Such a conclusion would be erroneous, for the fact that the canine teeth surpass those adjacent to them in height, favors a single hinge-like movement of the temporo-mandibular joint." The data do not justify Duckworth's inference. The overlapping of the canines in gorilla and hylobates limits the lateral movement of the mandible but does not preclude all lateral movement, unless when the teeth are close shut. This overlapping of the canines may, in fact, directly contribute to a lateral shift in the condyles, as such a shift must result when unequal lateral pressure is brought to bear on the respective canines. Duckworth seems not to have observed that with the shallowness of the fossa goes an increase in area greater than the increase in the condylar surface opposed to it. How this increase in area beyond that of the articulating condylar processes is to be accounted for, unless we suppose a lateral movement in the condyles, has not been suggested.

We have not been able satisfactorily to test this principle in the larger zoölogical world, nor have we been able to learn that the zoölogists have paid any especial attention to the matter. Professor Merriam informs us that the shallow fossa with large surface and low margins has been recognized by paleontologists as characteristic of those extinct species that show evidence of extensive use of the mandible in a side-to-side grinding movement—the sabre-toothed tiger, for example. Thus, as Topinard would say, there appears to be more zoölogical than anthropological significance in the form of the glenoid fossa in human skulls. It is one of many instances in which use and disuse will go far in explaining 'racial' characteristics. The cumulative value of such details may call for a modification of some current theories of physical anthropology, and an insistence that racial features can not be properly understood so long as we treat man as a creature outside of the larger zoölogical world of which, in truth, he is an integral part.

E. W. HAWKES
W. D. WALLIS

¹ Cabibbe, *op. cit.*

² *Morphology and Anthropology*, I, 173-4, 214, Cambridge Univ. Press, 1915.

THE DISTRIBUTION OF THE METHODS OF FIRE-MAKING

ON reading Dr. Hough's suggestive paper in the April-June number of the *Anthropologist*,¹ I must confess to have been surprised by some of the statements made in regard to the distribution of certain methods of fire-making. My amazement was the greater in view of Dr. Hough's earlier valuable papers on the subject, for he contradicts in this latest article his own former statements, and seems, moreover, to have entirely overlooked the abundant new evidence given in Dr. Balfour's recent monographs.² I am led, therefore, in a spirit of friendly criticism, to call attention to certain points in which Dr. Hough's paper is either misleading or incorrect.

It is said on page 258 that "generally speaking in the Western Hemisphere, Africa, Australia, the black islands, High Asia, only the fire-drill, 'fire-borer' was known." Although "generally speaking" this is true for the Western Hemisphere, Africa, and High Asia, it is by no means true for Australia or the "black islands," by which apparently, Melanesia is meant. Over a large part of Australia, as is well known, the fire-drill is not in use, and in Melanesia other methods almost everywhere prevail. A few lines further on it is stated that the fire-piston is peculiarly of the Malaysian area, whereas as a matter of fact, its use extends far into the interior of Indo-China among the Mon-Khmer tribes, and to the frontiers of Upper Burma, Tibet, and China, among the Tibeto-Burman Kachin. Neither these latter nor the Mon-Khmer tribes of the Shan States and Indo-China have been influenced, so far as known, by Malay culture. On the following page it is declared that "the races who possess the fire-saw have remained confined chiefly to the Malaysian area, and *those who use the thong-saw are limited to a portion of the Island of Borneo.*" As a matter of fact, the fire-saw is in use outside the Malaysian area in India, Assam, Indo-China, the Nicobar islands, a large part of Australia, scatteringly in both North and South America, and possibly in Central Africa. The limitation of the thong-saw to Borneo alone is incredible in view of Balfour's recent scholarly article on its distribution, in which he shows its use in Assam, the Malay peninsula (mainly among non-Malays), Indo-China, Borneo, the Philip-

¹ "The Distribution of Man in Relation to the Invention of Fire-making Methods," *American Anthropologist* (N. S.), Vol. XVIII, pp. 257-263.

² Balfour, H., "The Fire Piston." In *Anthropological Essays* presented to Edward Burnett Tylor in honor of his seventy-fifth birthday. London, 1907. Reprinted in *Report of Smithsonian Institution*, 1907, pp. 565-593. "Frictional Fire-making with a Flexible Sawing-thong." *Journal Royal Anthropological Institute*, Vol. XLIV, pp. 32-64.

pinus, and very widely in New Guinea (chiefly among the non-Melanesian population), with a possible case in Africa in the French Congo. Lastly, in speaking of the fire-plow, one is led to infer that its use is confined to the Polynesians, whereas of course it is widely in use throughout Melanesia.

Not a little of the theoretical structure which Dr. Hough has built upon his statements of the distribution of the methods of fire-making, falls when the real facts are considered, for in view of these, it is by no means so clear that the "inner court of Malaysia" is the region to which we must assign the invention of all or almost all the known methods of the production of fire.

While indulging in this spirit of criticism, one is curious to know on what evidence the theory is based of a movement of Indonesians *from* the islands to the Asiatic continent (not to speak of America) and of Polynesian migrations to the Philippines.

ROLAND B. DIXON

HARVARD UNIVERSITY

ANTHROPOLOGICAL NOTES

A PROTEST

The following protest signed by prominent European anthropologists has been received with the request that it appear in the *American Anthropologist*.

An den

Vorsitzenden des Organisationskomitees des XIX. Internat.

Amerikanisten-Kongresses

Herrn **F. W. Holmes**

U. S. National Museum

Washington.

Sehr geehrter Herr!

Die Unterzeichneten halten sich als Mitglieder des „Conseil permanent“ des Internationalen Amerikanisten-Kongresses für berechtigt und verpflichtet, gegen die in Washington abgehaltene Tagung entschieden Einspruch zu erheben. Diese Zusammenkunft hat die Grundbedingung des Kongresses, die internationale Beteiligung nicht erfüllt und nach den politischen Verhältnissen nicht erfüllen können, da die europäischen Amerikanisten mit geradezu verschwindenden Ausnahmen gar nicht in der Lage waren, die Reise zu unternehmen.

Das lokale Organisationskomitee von Washington beruft sich auf eine von ihm an die bereits eingeschriebenen oder weiterhin erwarteten Mitglieder gerichtete Anfrage, ob die Tagung im Dezember 1915 stattfinden solle: sie sei mit grosser Mehrheit bejaht worden. Dieser Weg war von vornherein verfehlt und unzulässig. Die Teilnehmer konnten vor Eröffnung der Tagung nicht votieren. Das Lokalkomitee seinerseits hatte überhaupt kein Recht, ihnen diese Frage vorzulegen, die gemäss der schwierigen und verhängnisvollen Situation vor das Forum des für solche Fälle eingerichteten Conseil permanent zu bringen war. Der Art. 15 der Statuten lässt hierüber nicht den geringsten Zweifel: „Un Conseil permanent composé des anciens présidents et secrétaires généraux est chargé de maintenir la tradition du Congrès, de veiller à la bonne exécution des règlements et de faire face aux difficultés imprévues qui pourraient surgir

dans l'intervalle de deux sessions". Da an eine Verhandlung unter Mitgliedern des Conseil permanent, die kriegführenden Staaten angehörten, nicht zu denken war, so blieb den Herren in Washington nichts anderes übrig, als — wie es so manchem anderen Kongress widerfahren ist — den Termin der Tagung bis nach dem Friedensschluss hinauszuschieben!

Die Zusammenkunft in Washington hat nun auch ihrerseits, indem sie als nächsten Kongressort eine Stadt in Amerika wählte, sich mit dem für unsern wissenschaftlichen Austausch wichtigsten Paragraphen 2 der Statuten in Widerspruch gesetzt, der „so weit möglich“ den Wechsel zwischen Alter und Neuer Welt fordert! Diese Möglichkeit lag durchaus vor, und gerade, wenn man sich auf den Standpunkt stellt, dass die Tagung in Washington gerechtfertigt war, so gebot, da Europa dort so gut wie ausgeschlossen blieb, schon die einfache Pflicht internationaler Höflichkeit, die bisher ausnahmslos gepflegte Tradition nun ganz besonders für den nächsten Kongress zu betonen. Nach dem jetzt gefassten Beschluss aber sind die europäischen Teilnehmer vor die Tatsache gestellt, dass ihr nächster Kongress erst 1920, d. h. 8 Jahre nach dem letzten in London stattfinden kann.

Wir müssen nach allem das Vorgehen des Organisationskomitees in Washington auf das tiefste beklagen und den schwerwiegenden Vorwurf erheben, dass das Komitee die Existenz und Fortdauer des ihm anvertrauten Kongresses in Frage gestellt hat.

Berlin und Wien, März 1916.

Fr. Heger, Generalsekretär Wien 1908.

G. Hellmann, Generalsekretär Berlin 1888.

Ed. Seler, Präsident México 1910.

Karl von den Steinen, Präsident Stuttgart 1904.

W. Freiherr von Weckbecker, Präsident Wien 1908.

Anthropological Data Obtained from a Deputation of Indian Chiefs Visiting Ottawa. In April and May, 1916, a deputation of two Nass River chiefs, one from Ayansh, the other from Kincolith, as well as a deputation of chiefs of some of the interior tribes of British Columbia (three Shuswap, one Upper Lillooet, one Lower Lillooet, one Thompson River, one Okanagan, and one Kootenay), under the care of J. A. Teit, of Spences Bridge, B. C., visited Ottawa on government business. The opportunity was taken by the Anthropological Division of the Geological Survey of Canada to obtain such anthropological information as the time at the disposal of the Indian chiefs made feasible. The results were gratifying.

Rather full data on relationship terms were obtained from six of the chiefs by E. Sapir. The tribes investigated were Thompson River, Lillooet, Shuswap, Okanagan, Kootenay, and Nass River.

The presence of two well-informed Nass River chiefs from distinct villages proved a good opportunity for C. M. Barbeau to supplement the intensive study of Tsimshian social organization that he had already undertaken in the field. The information obtained on three of the Nass River tribes includes plans of their villages; lists, arranged according to rank, of the families and of their subdivision into houses; lists of crests belonging to each; the origin and relationship, where possible, of each family with foreign tribes; and the mapping of their hunting, fishing, and fruit-gathering lands. In a few cases lists of individual names were also taken down. Mr. Barbeau also secured some special information from the Thompson River chief on the subject of tribal and individual property.

F. W. Waugh obtained detailed descriptions of several Nass River games, including lehal, and collected several interesting Lillooet, Kootenay, Okanagan, and Thompson River string figures. He also recorded a number of lehal songs.

The visit of the Indians was also fruitful for physical anthropology. A detailed series of physical measurements were taken on nine of the chiefs by F. H. S. Knowles. Front, three-quarters, and profile views were taken of each individual, and special photographs of the Thompson River, Kootenay, and Nass River chiefs in full tribal costume. Of the Thompson River and Kootenay chiefs also color plates were taken. Finally, face masks were made of the three Shuswap chiefs and the Lower Lillooet delegate, while head and shoulder casts were taken of the Kootenay and Thompson River Indians.

Henry Sale Halbert, historian and archeologist, died of tuberculosis in Montgomery, Alabama, on May 8, 1916. Mr. Halbert was born in Pickens county, Alabama, Jan. 14, 1837. He attended Union University, at Murfreesboro. Tenn., from which he received the degree of A.M. in 1856. From 1860 to 1861 he served with the Texas state troops in campaigns against the Kiowa and Comanche Indians, and as a private in the 6th Texas cavalry throughout the Civil War. From the close of the latter struggle until 1899 he taught in various schools and colleges in the South, and from 1900 to 1903 he was colonization agent for the removal of the Choctaw Indians living in Mississippi. After that period, and until his death, he was principally engaged,—assisted by

the liberal patronage of Dr. Thomas M. Owen, Director of the Alabama State Department of Archives and History,—in literary, historical, and archeological work at Montgomery, Ala. Mr. Halbert was a member of the Mississippi Historical Society, the Alabama Anthropological Society, and the Confederate History Club, of Montgomery, Ala., and an honorary member of the Alabama Historical Society. He frequently contributed to historical and archeological publications articles on Indian archeology, and cartography and on topics connected with the Civil War. He is also the author of a volume on *The Creek War of 1813-14* which appeared in 1895 and a manuscript work on the *History of the Choctaw Indians, 1540-1900*, which it is hoped will soon be published. He was coëditor of the Choctaw Dictionary of Cyrus Byington with the writer, published in 1915 as *Bulletin 46* of the publications of the Bureau of American Ethnology.

Mr. Halbert was an enthusiastic and painstaking student, and personally of a gentle and lovable disposition. In his removal, southern history and archeology have suffered a heavy loss, and the Choctaw nation in particular a devoted, self-appointed historian whom it will be well nigh impossible to replace.

JOHN R. SWANTON

Joseph Deakins McGuire, who for 35 years practised law at Ellicott City, Md., and who was known for his collection of Indian relics, died at Baltimore on September 7th after a long illness. Mr. McGuire was born in 1842 in Washington, the son of the late James C. McGuire.

Mr. McGuire spent his early life in Washington, and when the Civil War broke out he left Princeton University and tried to enlist in the Confederate Army, but his father objected on account of his youth and he was sent abroad, where he studied languages and scientific farming.

Returning to America he settled at Wilton, near Ellicott City, his home for 35 years. He practised law in all the Maryland courts and for 16 years was state's attorney for Howard county. In 1900 he moved to Washington.

Mr. McGuire was deeply interested in the history of American Indians and his collection of stone implements from the area around Baltimore and Washington was the largest in this part of the country. It is now a part of the National Museum. Mr. McGuire also wrote a number of books on archeology, which were published by the National Museum, the most important being the "Study of Primitive Methods of Drilling," *Report of the United States National Museum*, 1894, and

"Pipes and Smoking Customs of American Aborigines," *Report of the United States National Museum*, 1897. In recognition of his scientific work, Princeton University conferred upon him the degree of master of arts and restored him to the roll of the class which he left when the war broke out.

THE SUSQUEHANNA RIVER ARCHEOLOGICAL EXPEDITION in charge of Messrs. W. K. Moorehead, Alanson Skinner, and George P. Donehoo, finished its work the 1st of August.

The party consisted of nine men, and began work at the head of the river, Otsego lake, New York state.

A preliminary survey was made of the entire river, from its source to Chesapeake bay. Local students and collectors coöperated with the expedition at various points.

The party examined a large number of sites along the Susquehanna, and exposed ancient villages attributed to the Delaware, Shawnee, Iroquois and Andaste Indians. A collection of several thousand specimens was secured for the Museum of the American Indian, Heye Foundation.

The most important discovery during the journey was the location and excavation of an Andaste cemetery, near Athens, Pennsylvania, where fifty-seven skeletons were unearthed, with interesting specimens of Iroquoian pottery, pipes, and stone implements. Contrary to absurd newspaper reports, none of the skeletons were abnormal, nor were they found in a mound. One of the burials, of the so-called "bundle" type was of unusual interest, since it was covered by a deposit of the antlers of the Virginia deer.

THE SECRETARY OF THE AMERICAN ANTHROPOLOGICAL ASSOCIATION has received a set of three bound volumes made up of the various papers published by Mons. Léon Coutil of Saint-Pierre-du-Vauvray (Eure), *Correspondant* of the *Ministère de l'Instruction publique*, and of the *Sociétés d'Anthropologie de Paris and Lyon*. Many of these papers are reprinted from the *Comptes rendus* of the *Congrès préhistorique de France*, of which Mons. Coutil is a past President. Others are from the *Comptes rendus* of the French Association for the Advancement of Science, and of the International Congresses of Anthropology and Prehistoric Archeology, the *Bulletins* of the *Société préhistorique française*, *l'Homme préhistorique*, and local publications.

In the first volume are assembled papers on the paleolithic and neolithic periods, and especially the megalithic monuments of France. The

second and largest volume is limited to the bronze age and the Hallstatt epoch in Normandy, Jura, Savoy, and Alsace; while the third deals with the Gallo-Roman epoch, and those of the Franks and the Normans in Normandy. Mons. Coutil is to be congratulated on the character and extent of his archeological contributions as exemplified in the present *recueil*.

G. G. MACC.

MR. NEIL M. JUDD, of the U. S. National Museum, returned at the end of July from western Utah, where he had been engaged, since June 1, in the investigation of certain archeological remains, under the direction of the Bureau of American Ethnology. This season's work was in continuation of that begun during the preceding year, following Mr. Judd's reconnaissance of the Utah field. It is gratifying to note that, as a result of the limited excavations already accomplished, it has been possible to extend the northern limits of the ancient Pueblo area, and to say with certainty that the house remains of western Utah represent a vast prehistoric population closely related, culturally at least, to the well-known cliff-dwelling and house-building peoples of Arizona and New Mexico.

DR. ALEŠ HRDLIČKA, of the National Museum, returned recently from field-work which occupied three months among the Sioux and Chippewa Indians. Part of his work consisted in determining the anthropological status of the different bands of the Sioux; the main object of the expedition, however, was the determination of the blood status of approximately 800 Chippewa Indians for the U. S. Department of Justice. In both of these directions the trip was successful. Besides other things Dr. Hrdlička brings back several valuable skulls of the Sioux Indians.

DR. WALTER E. ROTH, who made a large ethnological collection recently for the Smithsonian, has sent six interesting specimens to the Bureau of American Ethnology, from Marlborough, Pomeroon river, British Guiana. These objects include two gourd rattles, a rasping stick, a tube of poison for darts, and pottery secured from aborigines of Guiana. After being photographed for use in illustrating a report on the work being done by Dr. Roth, these specimens were transferred to the Museum anthropological collections.

DR. WALTER HOUGH returned at the end of July from investigations for the Bureau of American Ethnology, in western New Mexico and

northern Arizona. During this work he discovered the ruins of a remarkable village of semi-circular pit houses, seemingly of great antiquity. During the last month of his work he pursued investigations regarding the arts and industries of the Hopi Indians, and witnessed a number of katchina ceremonies.

A DIPLOMA AND A MEDAL awarded to the Smithsonian Institution for scientific achievement, at the Panama-Pacific International Exposition, have been deposited in the National Museum. The Bureau of American Ethnology and the International Catalogue of Scientific Literature have received diplomas of awards of grand prizes "for scientific investigations," as participants with the Institution.

MR. J. N. B. HEWITT of the Bureau of American Ethnology, returned July 6 from investigations among the Canadian Iroquois. He brought with him several articles of ethnological interest, but his work was mainly devoted to the study, interpretation, and correction of texts in Cayuga, Onondaga, and Mohawk.

MISS FRANCES DENSMORE, who has been conducting work for the Bureau of American Ethnology, in Minnesota, expected to leave for Fort Duchesne, Utah, on July 31, in order to be in time for a great gathering of Ute Indians at the Duchesne agency on August 7.

DR. J. ALDEN MASON has been appointed Assistant Curator of Mexican and South American archeology in the Field Museum of Natural History, and will assume his new duties on January 1, 1917.

MR. JAMES MOONEY of the Bureau of American Ethnology has returned to Washington from investigations among the Cherokee of North Carolina.



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THE TERMS OF RELATIONSHIP OF PENTECOST ISLAND

By JOHN R. SWANTON

READERS of Dr. Rivers' now classic work on *The History of Melanesian Society* are well aware of the careful consideration which its author bestows upon the anomalous terminology of Pentecost Island, and his attempts upon the basis of these data to account for those anomalies by postulating equally anomalous marriages. Without undertaking an elaborate study of the whole Pentecost system as revealed in Dr. Rivers' work the writer has recently made a partial examination of it and has observed certain facts which do not appear to have been brought out clearly by Dr. Rivers, facts which may point toward an interpretation different from that which Rivers gives.

The Pentecost system may be represented as in the accompanying tables which give all its essential points. The people of Pentecost are divided into two exogamous moieties, and it appears that these moieties are further subdivided into segments which have force in regulating marriage, but Dr. Rivers was unable to learn much about these and I will pass them over, assuming for the sake of simplicity that the dual division is absolute. For the purposes of this discussion, whether the two divisions are simple or not does not concern us. The terms underlined in each of these tables are those which apply to persons in the moiety of the speaker; the others apply to persons in the opposite moiety.

TABLE I

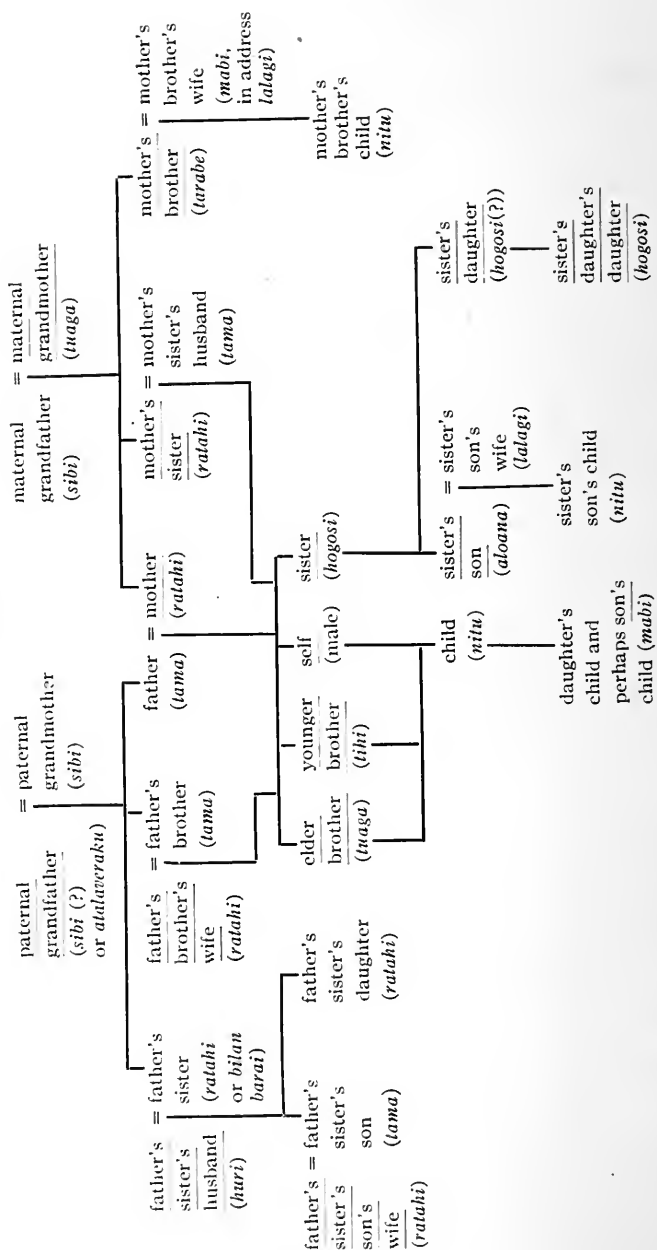


TABLE II

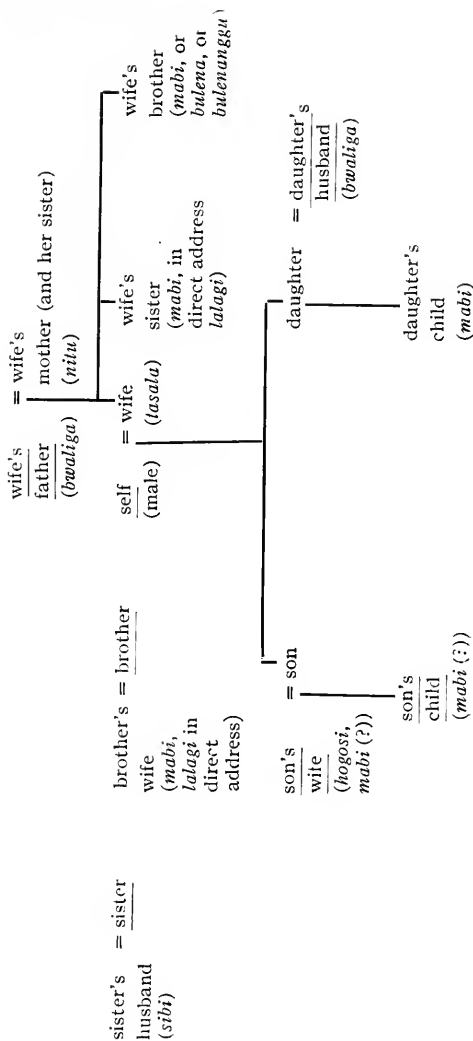


TABLE III.

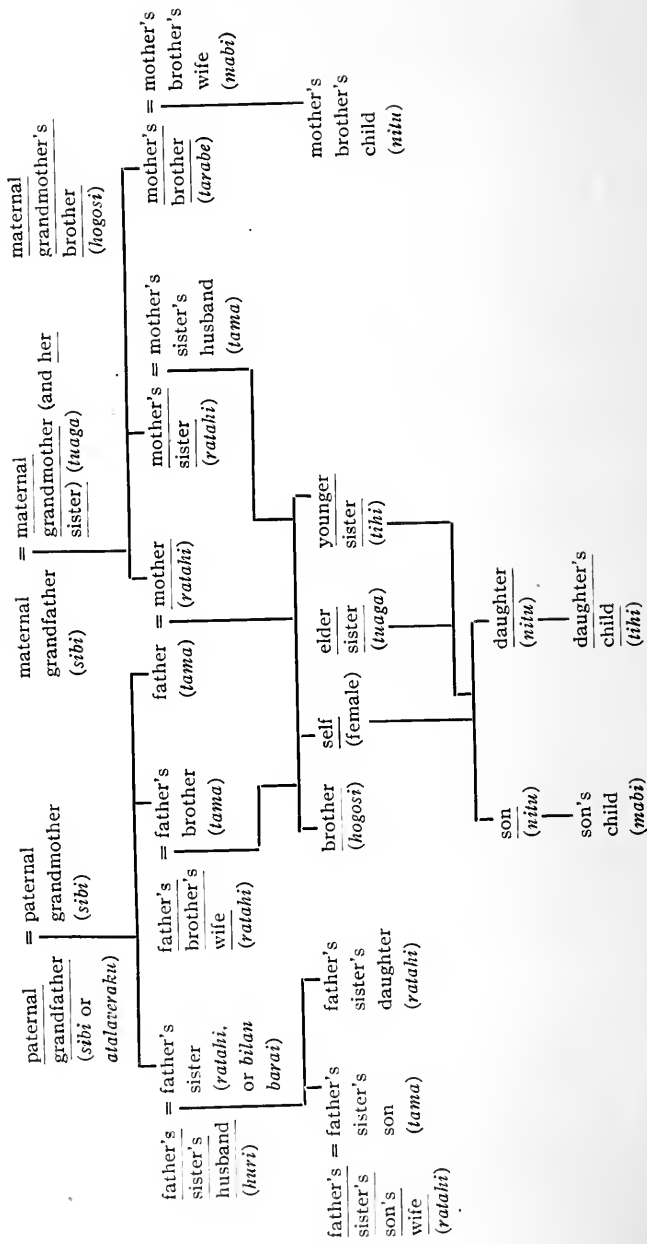
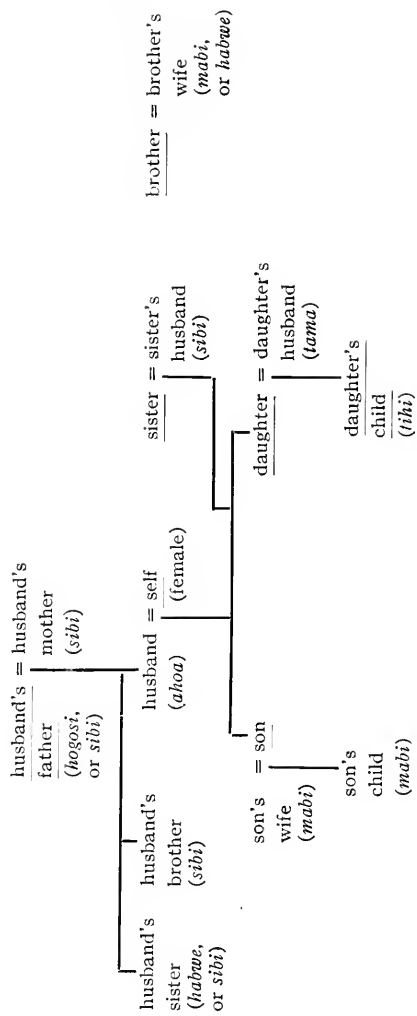


TABLE IV



A certain number of these terms are individual in application or have a very restricted usage. Such are *bwaliga*, *habwe*, *bulena*, *atalaveraku*, *huri*, *tasala*, and *ahoa*. Taking up the remainder we find that the use of *nitu* is governed by blood relationship, since both sexes apply it to own children regardless of moiety, and by extension to brothers' and sisters' children respectively. The term *ratahi* may be used in both moieties, but evidently its more natural and perhaps its original use is in the moiety of self. This probability is strengthened by the appearance of an alternative term for the father's sister, *bilan barai*. The term *tama* is bounded strictly by moiety lines. It is applied solely to men in the moiety opposite from self and seems to have been used for a great number of men in that moiety. On the other side the terms *tuaga*, *tihī*, *hogosi*, *tarabe*, and *aloana* are limited to men and women of the speaker's own moiety, and in each case sex is also distinguished, except that the first three alter with a change in sex on the part of the speaker. Up to this point, we have found but five terms which set apart classes of persons of a defined sex and of the speaker's moiety, although one other (*ratahi*) should perhaps be added to them since it applies rather to members of the speaker's moiety than to those of the opposite. On the other side we have found but one term so used for a class in the opposite moiety, a term moreover given to males.

Now, turning to the two remaining Pentecost terms, *sibi* and *mabi*, we find them put to the following uses:

Sibi is used:

- (1) for the sister's husband by both sexes,
- (2) for the husband's brother by a woman,
- (3) for the husband's sister by a woman, though there is another term,
- (4) for the husband's mother by a woman,
- (5) for the husband's father by a woman, according to one account,
- (6) for the father's mother and the mother's father by both sexes,
- (7) for the father's father by both sexes according to some.

Mabi is used:

- (1) for the brother's wife and the wife's sister by a man,
- (2) for the wife's brother by a man, though there is another term,
- (3) for the brother's wife by a woman, though there is another term,
- (4) for the son's wife, by a woman,

- (5) for the son's wife by a man, according to one account,
- (6) for the son's child by a woman,
- (7) for the daughter's child by a woman,
- (8) for the son's child by a man, according to some accounts,
- (9) for the mother's brother's wife.

Dr. Rivers appears to have assumed, in his consideration of these terms, that their application to the grandparent and grandchildren respectively was fundamental. I wish, however, to call attention to the exceedingly anomalous manner in which they are employed to cover those relations. So far as the writer's experience of the terms of relationship employed by primitive people goes it is usual to find, among those having clans or gentes, one term for grandmother, one for grandfather, and one for grandchild, each often extended to cover many persons. The distinctive thing about them is, however, that they are not used to mark clan or moiety differences. "Grandfather" and "grandmother" are used for males and females two generations back in two different clans or moieties. Some tribes do indeed have a single term for the grandparents, and again we find sex distinguished in the grandchildren. I do not, however, know of a case in which these particular terms were employed to mark off groups in the father's clan from those in the mother's. Nor does Dr. Rivers in his Oceanic work appear to have found anything different in most of the islands which he has investigated. In his present work the only exceptions are the interior of Viti Levu, where there is sometimes a term for each grandparent, and Pentecost. In Pentecost particularly there is a strong tendency in this very direction. Thus the word *sibi* is used unquestionably for the father's mother and the mother's father, both of whom must belong to the opposite moiety, while there is a difference of opinion regarding its use for the father's father, and it is not employed for the mother's mother. The term *mabi* is applied by a woman to her son's child, who must be of the opposite moiety, while she calls her daughter's child *tihi*. On the other hand a man calls his daughter's child *mabi*, while it is uncertain whether or not his son's child should be so called. This result at once raises a question whether the terms *sibi* and *mabi* were not properly used for classes of persons of the moiety opposite from self. And on

going over the tables we find our suspicion confirmed. In six cases *sibi* is applied to individuals of the opposite moiety and in nine cases *mabi* is so applied. In three disputed cases only *sibi* and *mabi* appear to be used for persons of the speaker's own moiety. This assuredly is not accident. Again, we observe that *sibi* is applied more often to men than to women and *mabi* more often to women than to men. *Sibi* is applied to men in five cases, including two disputed cases, and to women in three cases, including one case in which there is an alternative term. *Mabi* is applied to women in six cases, including two doubtful cases, to men in one disputed case, and to individuals of both sexes in three cases, one disputed. The evidence here is not strong, but worth considering at least in the case of *mabi*. It is to be noted that the disputed cases always agree *either* in moiety or sex with the expected. Thus of the three cases in which the use of *sibi* is disputed or in which there are alternative terms two apply to males of the speaker's own moiety, while the third applies to a female of the opposite moiety. Of the four cases in which the use of *mabi* is disputed or in which there are alternative terms one applies to males of the opposite moiety, two apply to females of the speaker's moiety, while the fourth covers both sexes and applies to the moiety of the speakers.

These facts taken in connection with the poverty of terms that can be used exclusively for classes of individuals in the opposite moiety, especially the almost entire absence of such terms for women, lead me to suggest that *sibi* and *mabi* may be primarily collective terms applied to men and women respectively in the opposite moiety. *Mabi* would then be the only term which could be used solely for the class of women into which a man could marry, for we have seen that neither *ratahi* nor *nitu* includes *only* persons of the opposite moiety and *nitu* is indefinite as to sex. Consulting the terms connected with marriage it will be noticed that they are clear on two points, one that a man calls his brother's wife and his wife's sister *mabi* and the other that a woman calls her husband's brother and her sister's husband *sibi*. My suggestion is that *sibi* connoted originally, or at least primarily, a group of males of the moiety opposite from one's own and *mabi* a group of females of

that moiety with whom the women and men of the speaker's clan might marry.

Tuaga was used by a man for his elder brothers and a woman for her elder sisters, and *tihi* was used in the same way for younger brothers and younger sisters respectively. The only other terms which may apply solely to men of the moiety of self are *tarabe* and *aloana*, the former given to the mother's brother, the latter by a man to his sister's son—but perhaps also by a woman to her brother's son, although Dr. Rivers does not give the data for this relation. The Pentecost islanders then have chosen to extend the term *tuaga* over the maternal grandmothers and the term *tihi* over daughters' children. That is the only interpretation the use of such terms requires, and it explains sufficiently why the maternal grandmother's brother is called *hogosi*, a matter puzzling to Dr. Rivers. Why they chose to accept these terms with the connotation placed upon them by women instead of that placed upon them by men, I do not pretend to say, any more than I pretend to say why they used these particular terms instead of extending the terms *tarabe* and *aloana*.

Although not precisely parallel certain terms of relationship in Creek and Chickasaw show that an exogamous group such as I have postulated may include grandparents. In these tribes both the paternal and the maternal grandmother are called by precisely the same term as the father's sister, and along with the father's sister all of the women of the father's clan. All of the relations included agree in sex but differ in clan, for while the father's mother belongs to the same clan as the father's sister, the mother's mother belongs to one's own clan. But while the Creek and Chickasaw have chosen to apply one term to all of the women of the father's clan and to all of the women in the speaker's clan two generations back of him, the Pentecost islanders have chosen to keep one term for members of the opposite clan two generations back of self but have not preserved the distinction of sex. In the same way they have chosen to preserve the distinction of clan in the second generation below the speaker but have not preserved that of sex.

To show the fallacy of the kind of reasoning indulged in by Dr. Rivers I will cite the terms which Creek and Chickasaw women

apply to their mother's brother's child and to their brother's child. Both are called *amosuswa*, the term which men and women alike give to their grandchildren, and in accordance with Dr. Rivers' procedure in such cases we would have to assume that it was customary for a woman to marry someone of the status of her maternal grandfather. Such a marriage is allowable, but in that case the woman's mother, maternal aunt, and maternal uncle would be her stepchildren. The wife of her maternal uncle ought then to be known by the term she uses for her daughter-in-law, *qnhatisi*, when as a matter of fact it is *tcqhatacawa*, elsewhere employed to designate the husband's brother or sister, the sister's husband or the brother's wife. Since the uncle was of the woman's own clan we must suppose that the resemblance in terms points to a time when a woman's maternal uncle was her brother and at the same time her stepson. Moreover she calls her brother's child by this same name *amosuswa*, which points to marriage with her own father or her father's brother. Are we to suppose that she married her mother's father and also her father's brother, or that these two were once one and the same person?

As a matter of fact marriage with the father's brother was prohibited by the ancient Creek, and the feeling against endogamous marriages was very strong, too strong for us to suppose for a moment that marriages of the kind indicated could have affected the terms of relationship in any such manner as the one proposed. In short I have no reason to think that the terms which we find reflect any previous marriage customs. In a general way they do mark the presence of a clan system but that is practically all that can be predicated of them. It seems evident to me that the reason why a Creek or Chickasaw woman calls the child of her brother, and the child of her mother's brother *amosuswa* is because she categorizes them with the child of her son. All share this in common that their fathers were men of her clan. It is also extended to those whose mothers were women of her clan except the children of women whom she calls mother or little mother, in which case they are brothers and sisters, and the children of those women whom she calls sister and who are in fact her own sisters, in which case she calls them sons and daughters.

Marriage between a classificatory grandfather and granddaughter would, as a matter of fact, soon cease to have any meaning, since the generations would become inextricably entangled. So far as marriage with one's elder brother's granddaughter is concerned it is quite possible but unless prescribed by a rigid law of which Dr. Rivers has given no indication, it would occur in so few cases proportionately as to have practically no effect upon the terminology of the people. As to the remark of John Patutun, Dr. Rivers' informant, that Pentecost was a place where "they married their granddaughters" it was evidently nothing more than an aspersion founded on his knowledge that men married women to whom they applied the same relationship term as to their granddaughters, nothing more. The fact that the bars are let down in a certain direction doubtless tends to induce the herd to take that course, but it does not follow that because they take that course they let the bars down. If the granddaughter or brother's granddaughter happens to fall into the group from which a man chooses his wife he is more likely to select her than if she does not, but it does not follow that the systematic espousal of granddaughters was the cause of her being in that group.

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RECONSTRUCTION FROM SURVIVALS IN WEST AUSTRALIA

By A. A. GOLDENWEISER

EVER since Tylor with far-reaching vision lifted the veil from primitive culture, "survivals" have figured as the one great standby of the evolutionist. Later, when the doctrine of evolution, in its application to culture, began to waver under the stress of accumulating ethnographic knowledge and deeper theoretical insight, "survivals" were destined to bear the brunt of the attack directed by the critical ethnologists against the representatives of the orthodox school. It was shown that "survivals" could not be regarded as proof of a developmental process but merely as suggestive illustrations of such a process assumed at the outset; also that "survivals" were as likely to be prospective as retrospective symptoms. Meanwhile, the momentum of methodological rigor is likely to carry one beyond the stage of critical doubt to that of dogmatic denial. For whereas "survivals" are misleading and furnish at best but a very dangerous tool, "survivals," nevertheless, undoubtedly occur; hence, if only proper care is exercised, they may not be excluded from the field of legitimate ethnological procedure.

In the pages that follow I propose to examine the data furnished by A. R. Brown on the Kariëra tribe of west Australia,¹ in an attempt to show that some of the data must be interpreted as survivals of conditions different from the present which existed at some time in the past.

KARIERA SOCIETY²

"The Kariëra tribe occupies the coast of western Australia

¹ "Three Tribes of Western Australia," *Journal of the Royal Anthropological Institute*, vol. XLIII, 1913, pp. 143-194.

² In the following account Brown's description will be followed as closely as possible.

from a point to the east of Sherlock river to a point east of Port-Hedland, extending inland for about 50 miles." The Kariera have many names designating localities. Often these names are derived from animals or insects by the addition of the ending *-na*, *-adina* or *-indina*. In a number of instances the same name occurs in more than one locality. The territory of the Kariera comprises a number of local groups. Brown estimates very roughly that there may have been some twenty or twenty-five such local groups, that those of the coast occupied a territory of about one hundred square miles each, while those of the interior may have occupied from one hundred and fifty to two hundred square miles, and that the population of a local group must have averaged not less than thirty individuals. The local groups had no names. Every person belonged to the local group of his or her father. The territory of a local group with its entire flora and fauna was the common property of all the members of the group. Over that territory they could hunt at all times, while hunting on the territory of another local group could be done only on permission from the members of that group. This rule was rigidly adhered to in former times, and the punishment for its transgression was death.¹

Within the local group the individual family, consisting of a man, his wife or wives, and their children, enjoyed a considerable degree of independence. Such a family would often travel or hunt by itself, or visit another local group and hunt on the territory of its host. Owing to certain traits in the composition of a local group, the nature of which will appear in what follows, marriages could not occur between individuals of the same group. The result of this was that in a local group the men, unmarried women, and children belonged to it by descent, while all the married women belonged by descent to other local groups.

Every Kariera was a member of one of four social divisions or classes and married into a definite other one, the classes being

¹ Cf. the highly interesting data on family hunting territories recently published by F. G. Speck: "The Family Hunting Band as the Basis of Algonkian Social Organization," *American Anthropologist*, vol. 17, 1915, pp. 289-306; and "Family Hunting Territories and Social Life of Various Algonkian Bands of the Ottawa Valley," *Department of Mines (Canada), Geological Survey Memoir* 70.

so arranged that every local group comprised two non-intermarrying classes, while marriages took place between two intermarrying classes of two local groups. The classes were named Banaka (*A*), Palyeri (*C*), Burung (*B*), and Karimera (*D*). Thus every local

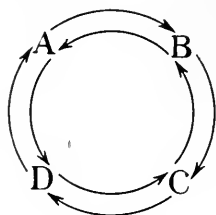


FIG. 54

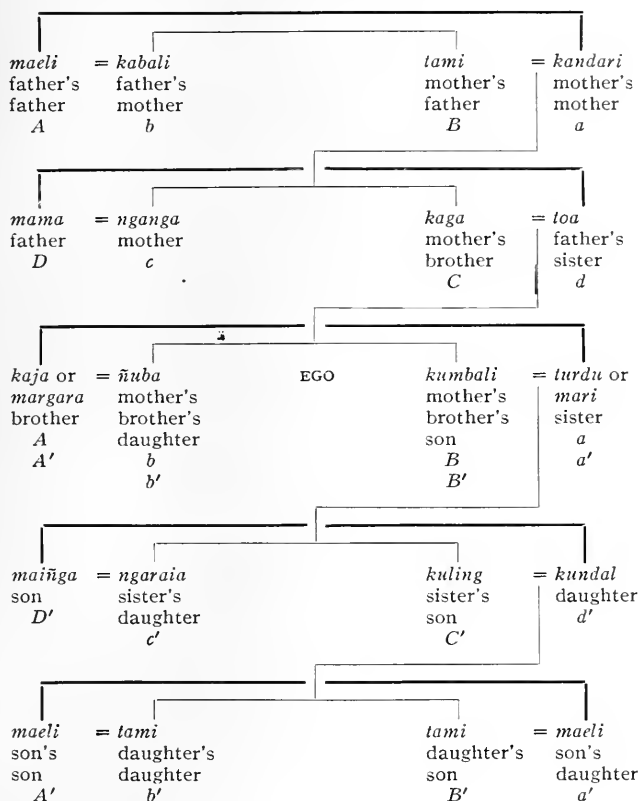
group comprised either classes *A* and *C* or *B* and *D*, while the intermarriages and descent occurred as follows: *A* marries *B*, the children are *C*; *C* marries *D*, the children are *A*; *B* marries *A*, the children are *D*; and *D* marries *C*, the children are *B*. Thus the children always belong to the complementary class of the father's local group.

It seems that all members of a local group were related by blood, and that the degree of such relationship was known by means of the genealogical records kept in the memories of some of the older men and women. There were also definite rules of behavior toward different relatives, and the individual whose relationship to the group could not be traced, toward whom therefore there were no prescribed rules of behavior, was a stranger, and his presence in the camp was not desired. Except in the case of children, who were called by personal names, relationship terms were used for addressing or referring to individuals. Despite the classificatory character of the relationship system, a clear distinction was made between close and remote relatives designated by the same term.

From the point of view of a man the relationship system may be represented as in the accompanying table.¹

The = in the diagram indicates marriage. *A*, *A'*, *B*, *B'* (male), etc., and *a*, *a'*, *b*, *b'* (female), etc., refer to the classes; *A*, etc., and *a*, etc., indicating individuals other than ego or belonging to one of the ascending generations, while *A'*, etc., and *a'*, etc., stand for individuals younger than ego or belonging to one of the descending generations. The terms in the diagram have all wider meanings than the primary ones given. Thus *mama* applies also to father's brother and mother's sister's husband; *nganga* to mother's sister

¹ Brown's exceptionally clear diagram is reproduced in the text on page 469.



and father's brother's wife; *tami* (in the second ascending generation) to father's father's sister's husband; etc. It will also be noted that *maeli* is used reciprocally for father's father as well as for son's son and son's daughter, *tami* for mother's father as well as for daughter's daughter and daughter's son.

From the diagram the relation of the system to marriage and to the classes readily appears. The proper person for a man to marry is his *nuba*, the daughter of any *kaga* and any *toa*. Whenever possible he will marry the daughter of his closest *kaga* and *toa*, that is, the daughter of his father's sister, of his mother's brother, or of both. Brown's genealogies indicate that such marriages always take place, when possible. It appears then that the proper women for a man to marry constitute only part of the women of the

class into which he marries. Thus, if ego (male) belongs to class *A*, not all women of class *B* will be his potential wives; he will marry his *ñuba*, but he may not marry his *kabali* nor his *tami*. Marriage, then, is regulated by relationship, while the class is an exogamous unit in so far only as among its women and among its women alone are found the potential wives whom the men of the marriageable class may marry. Again the extension of the relationship terms coincides with the class limits. Thus to a man (or woman) of class *A*, all the men of that class will be either *maeli* (*A* or *A'*), *kaja* (*A*) or *margara* (*A'*), while all the women of that class will to him be either *kandari* (*a*), *turdu* (*a*), *mari* (*a'*) or *maeli* (*a'*), and so on with the other classes.

Elopements with women married to other men occurred. If such a woman was not a *ñuba* of her companion, she was, if caught, beaten by her female relatives, while the man was speared through the thigh. If she was a *ñuba*, it was the duty of the husband to get her back. In such cases fights would ensue in the course of which one or both of the contestants might be killed.

Brown proposes the term "clan" for the local group constituted as described above, that is, a group of some thirty individuals related by blood, who have no group name, possess in common a certain territory within which they have exclusive hunting rights, and comprise two matrimonial classes, either *A* and *C*, or *B* and *D*, which do not intermarry, each of the classes marrying into one class of local groups with the complementary classes. Children belong to the local group of the father and to the opposite class.

Each local group ("clan") constitutes a totemic group with several totems. All the totems of the group belong to all its members. The same totems do not seem to occur in both "couples," also an exceedingly small number of totems occurs in more than one local group. In every local group there are a number of *talú* or totemic centers which are often marked by a boulder or a heap of small stones. At these totemic centers ceremonies are performed, in which men and women participate, the headman of the local group playing the principal rôle. The object of these ceremonies is the multiplication of the totemic species. Otherwise,

however, the totem is in no way worshipped or even respected, nor are there any taboos.

In a large number of cases the name of the place where a totemic ceremony is performed is derived from the totem by means of the suffix *-na*. Brown was able to persuade himself in a number of instances that the totemic species was particularly plentiful at the totemic center.¹ In other cases, again, a place name is similarly derived from a plant or animal particularly abundant about the locality, although no ceremony is performed, the animal or plant species in question not being a totem.

KARIERA AND ARANDA

While the description of Kariera society as here outlined does not in itself present any particularly striking features, it must appear peculiar to one familiar with Australian conditions. Before any further comparisons are indulged in, however, it will be well to correct two points in Brown's presentation.

According to the author descent of the class among the Kariera follows the father as well as the mother. He calls the groups $A + C$ and $B + D$ couples or pairs, while the combinations $A + D$ and $B + C$ are designated as cycles. He proceeds to state that "the children of a woman always belong to the same cycle as herself, but to the other class of the cycle" and that, on the other hand, "the children of a man always belong to the same couple as himself, but to the other class of the couple" (p. 148). Now, the conditions as thus presented arouse the impression of double descent, an institution quite foreign to the Kariera. As a matter of fact, while in cases such as this it is not quite correct to speak of paternal descent of the class, the facts justify the statement that the child belongs to the local group of the father and to the class which together with the father's class constitutes the couple or pair.

¹ It is interesting to recall in this connection Durkheim's theory of totemism, one of the elements of which is the assumption that a group congregating in a certain locality for ceremonial purposes derived its name from the animal or plant prevalent in that locality (cf. *Les formes élémentaires de la vie religieuse*, p. 335.) See also Strehlow, "Die Aranda- und Loritja-Stämme in Zentral-Australien," *Veröffentlichungen aus dem Städtischen Völker-Museum Frankfurt am Main*, part 1, p. 4.

As to the maternal "cycle," it is a pure figment, for there is no other bond between the mother's class and that of her child but the very fact that they belong to the two different classes. One might with as much justice hold that in a tribe with an exogamous and paternal dual organization there is also a maternal principle involved in so far as the child belongs to the other moiety from that of its mother.¹ The second rectification refers to Brown's use of the term "clan." The author's "clan" has, among others, two traits, one positive, one negative, which are not found as attributes of clans elsewhere in Australia, but are found as attributes of the phratry: the "clan" is a local group and it has no name. We shall presently see that there is good reason to compare the organization of the Kariera with the tribes of the Northern Territory. Now, among these tribes the phratry, while not strictly speaking a local group, has distinct local associations, such as camping together;² again, while some phratries have names, others, such as those of the Aranda, Loritja and Binbinga, are nameless.³ The clan, on the other hand, is not a local group and always has a name, one derived from the totemic animal or plant. In other words, the "clan" corresponds to the phratry of the Northern Territory, and the term "local phratry" may therefore be appropriately applied to it.

If one again turns to the comparison with the tribes of the Northern Territory, he discovers that the four class names are clearly

¹ A similar mistake in grouping together social divisions which did not constitute a social unit was made by Klaatsch, who in consequence arrived at the conception of endogamous moieties among the Niol-Niol ("Schlussbericht über meine Reise nach Australien in den Jahren 1904-1907," *Zeitschrift für Ethnologie*, vol. 39, 1907, p. 656). Cf. also comments on Klaatsch's discussion by the present writer in "Totemism, An Analytical Study," *Journal of American Folk-Lore*, vol. 23, 1910, pp. 242-3. The concept and term "cycle" seems to have been borrowed by Brown from Mathews, who, however, makes a much more systematic and constructive use of it, thus arriving at artificial groupings and fictitious descent, which he attributes to a large number of tribes (see, for instance, his "Marriage and Descent in the Arranda Tribe," *American Anthropologist*, (N. S.) vol. 10, 1908, pp. 88-103).

² See, for instance, Spencer and Gillen, *Native Tribes*, etc., p. 70, and *Northern Tribes*, etc., p. 96; and Strehlow, *ibid.*, part IV, section 1, p. 62. The local separation of the phratries is reflected in the mythology of the Aranda (*ibid.*, part I, p. 3).

³ See Spencer and Gillen, *Northern Tribes*, pp. 90 and 93; and Strehlow, *ibid.*, part IV, section 1, p. 62.

the same (barring slight phonetic changes) as those of the four classes of the Arábana, southern Aranda, as well as of four of the subclasses of the northern Aranda and some other tribes with eight subclasses. Of the historical connection of these systems there can be no doubt. The marriage rule is also identical among the southern Aranda, Niol-Niol and Kariera.¹ The relationship system of the Kariera strictly corresponds in principle to that of the Arábana;² no terms for cousins, terms for elder or younger brother or sister, separate terms for mother's brother and father's sister, reciprocal terms between grandparent and grandchild, etc. The Kariera, again, are like the Arábana, southern Aranda, northern Aranda, and probably most other Australian tribes, in so far as marriage is determined by relationship; moreover, among the Kariera, as among the southern Aranda, the proper person in marriage is a particular individual of the marriageable class, namely, either the mother's brother's or the father's sister's son or daughter, or, in the absence of these, one of the other relatives designated by the same term. Here as there, also, the children, belonging to the other class of the father's phratry, of necessity belong to the class of the father's father.³ Similarly, as the Aranda and some other eight-subclass tribes further north have a different relationship system from that of the Arábana; and as, on the other hand, in the marriage systems of the eight-subclass tribes the primary four classes are in part differently combined in marriage and descent

¹ Following the orthography of Strehlow (*ibid.*, part IV, section I, p. 75), Klaatsch (*ibid.*, p. 656) and Brown (*ibid.*, p. 147), the classes are:

S. Aranda		Niol-Niol	Kariera
A } I	{ Pananka	Panak	Banaka
C } I	{ Paltara	Pardiara	Palyeri
B } II	{ Purula	Borong	Burung
D } II	{ Kamara	Karimb	Karimera

The marriages and descent in all three cases can be represented as on page 468.

The phratries of the three tribes have no names. Cf. also Thomas, *Kinship Organizations and Group Marriage in Australia*, map facing p. 40; and Graebner, "Wanderungen und Entwicklung sozialer Systeme in Australien," *Globus*, vol. xc, 1906, map on p. 183.

² Spencer and Gillen, *Native Tribes*, etc., p. 66.

³ Strehlow, *ibid.*, part IV, section I, p. 71.

than they are among the four-class southern Aranda; so the Mardudhunera, neighbors of the Ngaluma, neighbors of the Kariera, have a relationship system differing from that of the Kariera, but corresponding to that of the Aranda, etc., and their four classes are arranged for purposes of marriage and descent unlike those of the Kariera, just as the classes and descent of the northern Aranda and other eight-subclass tribes further north are in part arranged differently from those of the four-class southern Aranda.¹

With reference to the totemic system the similarity between the Kariera and some of the tribes of the Northern Territory is much less marked, but there are a number of points in common. Here as there, the phratry or local phratry comprises a varying number of

¹ The marriages and descent of the northern Aranda compare with those of the southern Aranda as follows:—(Strehlow, *ibid.*, part IV, section I, p. 75):

	N. Aranda		S. Aranda	
	I $\left\{ \begin{array}{l} A \\ A' \\ C \\ C' \end{array} \right.$		$\left. \begin{array}{l} A \\ C \end{array} \right\}$ I	
2 phratries and 8 subclasses				2 phratries and 4 classes
	II $\left\{ \begin{array}{l} B \\ B' \\ D \\ D' \end{array} \right.$		$\left. \begin{array}{l} B \\ D \end{array} \right\}$ II	

Among the S. Aranda A marries B, children are C ($A/B = C$), $C/D = A$, $B/A = D$ and $D/C = B$.

The system of the N. Aranda differs from this in so far as there $B/A = D'$ and $D/C = B'$.

The marriages and descent of the Mardudhunera compare with those of the Kariera as follows (Brown, *ibid.*, pp. 176-7):

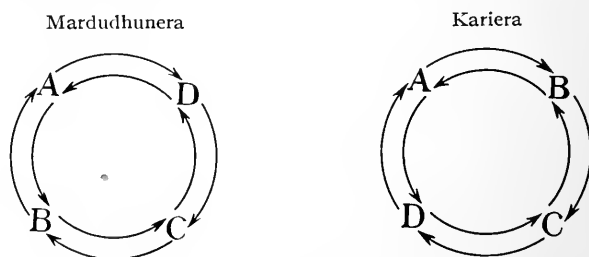


FIG. 55.

The phratric grouping and the descent is the same, but different classes intermarry.

totems which are restricted to that phratry;¹ the totems are associated with certain local totemic centers (Karia *nula* = Aranda *oknanikilla*), one for each totem, often adorned with stones, at which magical ceremonies are performed for the multiplication of the totemic animal or plant.²

On the other hand, the organization of the Karia possesses certain traits which sharply differentiate it from that of the tribes of the Northern Territory. In the relationship system of the latter the age factor plays a secondary part, and wherever it conflicts with the generation factor, the age factor is overridden.³ The opposite is true among the Karia: here the age factor rules, and when a relationship term, based on the generation principle, comes into conflict with the age factor, the relationship term is discarded in favor of a more appropriate one. The most striking differences, however, appear in connection with the totemic system. Whereas the phratry in the Northern Territory comprises a number of totemic clans, the local phratry of the Karia contains no further social subdivisions (barring the classes) but is itself associated with a set of totems. Again, whereas in the Northern Territory the totems are taboo, the totemic ceremonies are performed by the clanmates alone, women are excluded from the ceremonies, and the clan headman is the ceremonial leader (at least, among the Aranda),⁴ the Karia have no totemic taboo, or any other attitude towards the totems, the totemic ceremonies are performed by all the members of a local phratry, men as well as women participate, and the lead is taken by the local headman.

¹ Excepting, of course, the Aranda, among whom some of the totems occur in both phratries. This, however, is an anomalous condition, a consequence of Aranda ideas about the conception of children, and certainly a relatively late phenomenon, as has been definitely demonstrated by Lang (*cf.* particularly his "J. G. Frazer's 'Totemism and Exogamy,'" *Anthropos*, vol. v, 1910, pp. 1101 *seq.*, and article "Totemism" in *Encyclopaedia Britannica* (11th ed.), pp. 83 *seq.*

² Spencer and Gillen, *Native Tribes*, etc., p. 172, and elsewhere.

³ *Cf.* Strehlow, *ibid.*, part IV, section I, pp. 63-4.

⁴ Spencer and Gillen, *Native Tribes of Central Australia*, p. 168. Among the central tribes women often participate in the ceremonial reception of the men returning after the performance of the sacred rite, but they are always strictly excluded from the ceremony itself, in fact, from most things sacred. *Cf.* description of "Intichiuma of the Udnirringita or Witchetty grub Totem," *Native Tribes*, pp. 170-179.

The striking similarities between the Kariera and the tribes of the Northern Territory, in relationship systems, class organization, and even in certain features of the totemic complex, strongly suggest that the latter among the Kariera represents the surviving fragments of a once much richer organization along the lines of those of the Northern Territory. Here the question arises: do the conditions as recorded among the Kariera render the theory of degeneration plausible? That such is the case will be readily gathered from certain of Brown's remarks.

RECONSTRUCTION

On page 144 we read:

At the present day the natives of the Kariera tribe are nearly all living on the sheep stations that have been established in their tribal territory. They are fed and clothed by the station owners or at the expense of the Government, and the able-bodied men and women work on the stations. Their country has been occupied by the whites for about fifty years, and during that time their numbers have steadily decreased. At the present time there are not more than one hundred all told, men, women, and children. My own estimate would put their present number at between eighty and ninety [Brown's own numerical estimate of the Kariera tribe at some time in the past puts it at a minimum of seven hundred and fifty individuals (p. 146)]. All of them, except the oldest, can speak fairly good English.

When referring to the native's attachment to his own local group, Brown remarks:

At the present day the influence of white settlement has altered all this. The country now belongs to the white men and the natives have to live where they can (p. 146).

Again, with reference to the totemic ceremonies we read that

they have been discontinued for many years. I was therefore unable to see any of them performed and had to rely entirely on what the natives told me about them. Information of this kind is of course very unsatisfactory (p. 160).

The statement is made even more emphatically on page 166, where the author observes that

as the ceremonies in connection with the totems have been discontinued for many years, all the younger men are ignorant on matters concerning them, and often do not know their own totems. Even the statements of the old men are not always reliable.

In view of the far-reaching similarities between the Kariera and the tribes of the Northern Territory, in relationship systems, and their relation to marriage, in phratry and class organization, including class names, and their relation to marriage and the relationship system; as well as in the skeleton of the totemic system; in view also of such palpable evidence of deterioration under white domination; it seems justifiable to assume that the differences between the totemic systems of the Kariera and those of the tribes of the Northern Territory did not exist in the past or, at least, were much less marked than they are in the Kariera of Brown's description. What occurred since, may be roughly estimated as follows.

Where the generation factor or some other classificatory principle comes into conflict with the age factor, the results are likely to be least acceptable to the white man. To him, indeed, they will often seem ludicrous, as when a man applies the term grandfather to one younger than himself. This feature of the Kariera system was first to go; henceforth the age factor took precedence. Of the totemic clans which originally constituted the local phratry, many died out, while others became so depleted in numbers that they ceased to figure as independent social units and became merged in the local phratry which provided a natural bond of territorial solidarity. The eponymous totems of the clans, more tenacious on account of their relation to the totemic centers and the magical ceremonies, persisted and became associated with the local phratry as totems belonging to all the members of the local group.¹ Whatever sanctity may have attached to the totems in the past, disappeared, and with it went the totemic taboos. The magical ceremonies for the multiplication of the totemic species, deeply ingrained as they were in the economic life of the people and firmly associated with definite localities often named after the totems, lingered on for a while; but the leadership in the ceremonies, once the prerogative of the clan chief, was taken over by the local headman. As the totems became absorbed in the local phratry, all its

¹ This must not be understood to imply that *all* the present totems must once have been associated with separate clans, for some of these totems may have been associated totems in the past (*cf.* Strehlow, *ibid.*, part III, pp. xii *seq.*).

members—perhaps some thirty all told—were permitted to participate in the totemic ceremonies of the group, and in their number were men as well as women. Sanctity no longer attached to the ancient spots once haunted by totems material and spiritual. Amidst the “evaporated emotions” of a fading *intichiuma* the line of sex was no longer drawn.

If circumstantial evidence is to count at all in the estimation of survivals, it seems fair to assume that the totemic system of the Kariera, as described by Brown, represents but the distorted fragments of a rich totemic complex of the past, which, we conjecture, may not have been unlike those of the tribes of the Northern Territory.

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THE ORIGIN OF THE IROQUOIS AS SUGGESTED BY THEIR ARCHEOLOGY

By ARTHUR C. PARKER

THE origin of Iroquoian material culture is a subject of pertinent interest to every student of American aboriginal culture history. No comparative study has yet been attempted, and no one has been bold enough to gather all the facts and advance a working hypothesis.

The origin of the Iroquois was a mystery to Dr. David Boyle, even though he lived in one Iroquoian cultural center. Most writers have remarked that there are few places where Iroquoian artifacts are found unmixed with evidences of contact with the European. The few early sites, of pre-colonial occupation, therefore, ought to be most instructive to the investigator, but, as a matter of fact, the purely aboriginal material found in such sites differs but slightly from those of later date, except those of a very recent period. The archeology of the Ouendat or Huron, is apparently quite similar to that of the confederate Iroquois.

In pursuing our inquiry it is soon discovered that there are definite centers in which material known to be, or termed Iroquoian, may be found. In scattered spots bordering on these centers are isolated Iroquoian specimens, as on Manhattan Island, but the fact still remains that Iroquoian artifacts are only found in numbers within certain definite centralized localities, and that these objects are not seemingly more than five or six hundred years old. Many sites show an age of less than one hundred and fifty years. At most, let us say tentatively, that within the well-recognized areas, objects recognized as Iroquoian seem only to indicate a period of cultural fixedness of less than six hundred years.

The centers of prehistoric Iroquoian occupations, recognized as such by the objects known to archeologists as Iroquoian, are: (1) the St. Lawrence basin with Montreal as a center; (2) the

region between Georgian bay and Ontario with Lake Simcoe as a center; (3) the Niagara peninsula in Ontario following the Grand river; (4) the Genesee river—Finger lake region; (5) Chautauqua county, stretching across the Pennsylvania neck into Ohio; (6) the highlands east of Lake Ontario in Jefferson county; (7) Oneida, Madison, and Onondaga counties; and (8) the Susquehanna about Elmira. Circles of various circumferences may be drawn from these centers intercepting smaller centers. This plan of approximating areas is only a scheme to fix the localities in our minds, and no attempt is made to make them independent localities with definite boundaries. The contour of the land, streams, lakes, lines of travel, and danger from enemies largely determined the early limitations of occupied territory.

With these data in mind, we wish now to inquire which of these centers are the oldest and if there is any possible means of determining the causes that made Iroquoian material culture differ from the surrounding Algonkian. We wish to inquire, as others have before us, whence the Iroquois stock came into these centers and what clue may be found showing a migration from earlier centers. We wish to inquire just how definitely valuable are Iroquoian objects, as they are now recognized, in determining a migration from other regions.

Perhaps first, then, we ought to inquire just how permanent any form of material culture is and whether there have been any revolutions not to say modifications in the material culture of a stock. We ought to consider that there are Algonkian tribes, for example, that are Siouan in culture and Siouan tribes that are Algonkian as the Blackfeet and Winnebago respectively. The writer at one time showed some of the Lafitau drawings of Iroquoian villages to a Seneca Indian, who was a tribal authority on the modern religious ceremonies of his tribe. "Our people never lived that way," he said. In this it is seen that the Iroquois of today have totally forgotten their early fortifications and architecture, though Cusick in 1825 wrote of "forts." Of another native authority the writer asked the date when the Iroquois confederacy originated. "With the teachings of our great ancestor, Hand-

some Lake, I think," he replied. Then he added after hesitation, "No, it was before that, I remember now it was in the time of Dekanawideh."

In these answers, incorrect or uncertain as they are, may be found material for serious consideration. They point out two men with whose names are linked two distinct periods of cultural revolution. Each blotted out the memory of a former period. The people of each period systematically forgot the history of the preceding periods. Today the Iroquois of New York base nearly all their tribal ceremonies on the doctrines of Handsome Lake, who flourished between 1800 and 1815. So great was the influence of his teaching that he practically created and crystallized a new system of tribal thought and a new plan of action. His earlier predecessor was Dekanawideh to whom, with the aid of Hiawatha, is ascribed the origin of the Iroquois confederacy. Dekanawideh so crystallized the things of the older period with his own devices, teachings, and admonitions that the methods, beliefs, and thought-ways of the preceding period lost their identity in the minds of the Iroquois people. All civic and much of the religious thought centered in Dekanawideh. That which preceded was either blotted out or swallowed up. The Iroquois took on a new mantle. Now it does not seem impossible that before the time of Dekanawideh and Hiawatha, other seers had arisen to change or revolutionize the thought-ways of this stock.

The inquiry comes quite naturally, therefore, as to whether a like revolution could not occur in the material culture of a people. Might not the older systems of decorative art have been gradually abandoned and new ones taken on? Preceding the period beginning about 600 or 650 years ago, might not Iroquois art and artifacts have been different? Or, if there were no Iroquois in this region then, might not they have had differently decorated pottery, for example, when they came than that which later developed and is now known as Iroquoian? These are questions archeology may some day answer. Our present knowledge gives us only the Iroquois potsherd and does not tell us why it is as it is.

There are certain Iroquoian traditions that seem to have good

foundation, relating that at a certain period all the Iroquois were one people, living together and speaking the same tongue. Indeed so positive were the Iroquois of this that they could point out a certain woman and say that she represented the lineal descendant of the first Iroquoian family. Yet the confederate Iroquois knew that she did not belong in the five tribes. She was a Neuter woman. "When the bands divided," the traditions run, "it was found that the family of Djigo'sāsē, Fat Face or Wild Cat, fell to the Neutral Nation." She was called Yē-gowā'ně, The Great Woman, and she was "the mother of the nations." In the Dekanawideh-Hiawatha tradition, a woman with this title is represented as being constantly consulted by both Hiawatha and Dekanawideh. The latter was a Wyandot (Ojibwa) from the bay of Quinte, at the foot of Lake Ontario. This points to an early recognition of blood relationship and a recollection of the time when the Erie, Neuter, Huron, Seneca, and Mohawk-Onondaga were of one common tribe, a fact that archeology and philology, of course, definitely prove.

In this original tribe any culture revolution would definitely influence the various subdivisions and be carried by each as it separated eventually from the parent body. Constant intercourse would serve to preserve the culture until it became fixed. Now, assuming, for the sake of argument, that there was an "original tribe" and that a revolution did take place in the decorative art of the Huron-Iroquois, whence did that tribe come and when did its arts change? Traditions again point to a migration from the southwest. Ethnologists are familiar with the Delaware Walum Olum, but few are familiar with Iroquois migration myths, for the reason that they are few, and those brief and difficult to recognize as such.¹ However, so many of the Iroquois (confederated) myths point to the southwest country that we must pause to consider just why they have been handed down. We must ask why the "tree of the long sword-like leaves," is mentioned so often in the Dekanawideh epic, and why so learned an Iroquois as Dr. Peter Wilson

¹ We place no credence in the Cusick account as embraced in his *Sketches of the Ancient History of the Six Nations*.

called it a "palm tree." We must consider why so many Iroquois expeditions were directed against enemies down the Ohio and on the Mississippi. We must consider, too, a certain alleged grammatical resemblance between the Caddoan languages and the Iroquoian. Perhaps all these considerations will be termed fanciful and lacking in serious value, but even if this is admitted they do have the certain virtue of stimulating inquiry.

The older theory that all the Iroquois originated or had their early home along the St. Lawrence about Montreal is not entirely without serious flaws. I believe from archeological evidence that certain Iroquoian tribes never came from the St. Lawrence region, for example the Seneca. The Seneca and Erie divisions seem to have been as closely allied in western New York as the Onondaga and Mohawk were in northern and eastern New York. The Mohawk (or Laurentian Iroquois) never agreed with the Senecan division and there indeed seems to have been a long period of separation which made these two dialects more unlike than all the others of the five. It would seem that the early band of Iroquois had divided at the Detroit or the Niagara river, one passing over and coursing the northern shores and the other continuing on the southern shores of Erie and Ontario. It would seem that the northern branch became the Huron and Mohawk-Onondaga; that those who coursed south of these lakes became the Seneca-Erie, the Conestoga (Andaste) and the Susquehannock. It also appears that the Cherokee and Tuscarora separated earlier than the Senecan and Huron-Mohawk divisions.

In the analysis that follows we shall briefly consider the material culture of the Iroquois. In the topical discussion we have repeated certain facts under one topic mentioned in another, not for the sake of emphasis only but to obtain another view of the same facts when differently correlated.

AN OUTLINE OF IROQUOIAN MATERIAL CULTURE BASED ON ARCHEOLOGICAL EVIDENCE

In considering the origin of the Iroquois, their migration, and their connection with and similarity to other tribes or stocks, it is

of importance to know just what is typically Iroquoian; that is to say, what implements or ornaments may be regarded as distinctive.

Arrowheads.—The first object which a field investigator learns to recognize, as the sign of Iroquoian occupation, is the thin triangular arrowhead of chert. Nearly all Iroquois arrowpoints seem to have been of this type. On village, on campsite, or in graves the delicately chipped triangle is found almost to the exclusion of all other forms. It may not be regarded, therefore, as only a "war point" but also as a hunting point. Plenty of knives are found on Iroquoian village sites, but only a few chipped implements that may be regarded as spear heads. Very few flint drills are found in comparison with objects associated with other occupations. The same remark is also true of scrapers, although scrapers are found occasionally. The Iroquois were not flint workers as were their predecessors in this region and they used other material in place of flint wherever possible.

Polished Stone Implements.—The celt, better termed the ungrooved axe, and the flat-bellied adze were used by the Iroquois who seem never to have used the grooved axe. Their ungrooved axes, however, are well made and both types are, in many instances, carefully polished. The Iroquoian adze on the top or back is either beveled in flat planes or rounded. The small celts and adzes are common and seem to have been used as chisels and scrapers rather than as axes. In many instances these are simply water-washed stones, suitably shaped by nature, and rubbed to a cutting edge. The Iroquois seem never or rarely to have used gouges. They had perforated polished stone beads in abundance, but never seem to have used gorgets, stone tubes, birdstones, or banner stones. This is so common an observation on the part of the archeologist that it may be safely said that no polished stone implement with a hole drilled straight through it is Iroquoian. There were, indeed, polished stone pipes but no straight pipes. We except also stone beads and occasional small stone faces.

Stone Tools.—The Iroquois along the Susquehanna may have used stone hoes but the various overlapping occupations render this doubtful. It is certain, however, that the Iroquois did not

generally use the long cylindrical roller pestle, but some have been found on early sites. They did use a flattened muller and a shallow flattened mortar or meal-stone, and these are common on nearly all Iroquoian sites.

Notched sinkers are very common and generally were made of a flattened water-washed stone, about the size and shape of the palm of the hand, though various sizes larger or smaller are found.

Pitted stones are abundant. Some appear to have been hammers, judging from the battered edges, but others are pitted on either side and show no battering on the edges. Some of the pits are neatly and symmetrically drilled, others roughly picked in as if a flint had been pounded against the stone. This is especially noticeable in the softer stones. Other hammers are of diabase, granite, or other hard rock and have no pits. Their battered sides, some with flattened planes or faces, others rounded, give evidence of hard and prolonged use.

Anvils, that is flat stones upon which stone was hammered, are fairly common. Now and then an arrow shaft rubber is found and plenty of scratched stones, or "awl sharpeners" are in evidence and occasionally a "sinew stone" comes to light.

Shell Ornaments.—The later Iroquois loved shell ornaments such as beads, perforated shells, runtees and disks, masketts, and variously formed effigies, but they did not have them in any abundance until the coming of the white man. Shell beads of spherical shape, cylindrical, or even discoidal appear on early sites, most of them from the columella of the conch. Perforated periwinkles also were used but only a few beads small enough to be similar to the wampum of the colonial period have been found, compared with the abundance that later appeared. Large conch shells have been found on certain Neuter sites, especially in Erie and Genesee counties. Now and then a clam shell is found, used possibly as a potter's tool. The fresh water univalve was frequently employed for this purpose and they are sometimes found in pits filled with clay.

Pottery.—The most strikingly characteristic product of Iroquoian manufacture is pottery. Both in form and decoration, generally speaking, Huron-Iroquois pottery differs from that found in other

regions. At the same time we must qualify a statement of an absolute difference from all others, for on certain sites pottery is found that resembles, in many respects, the pottery of the Ohio village sites, as of Baum and Gartner, and even certain pottery of Tennessee but this is the exception and not the rule.

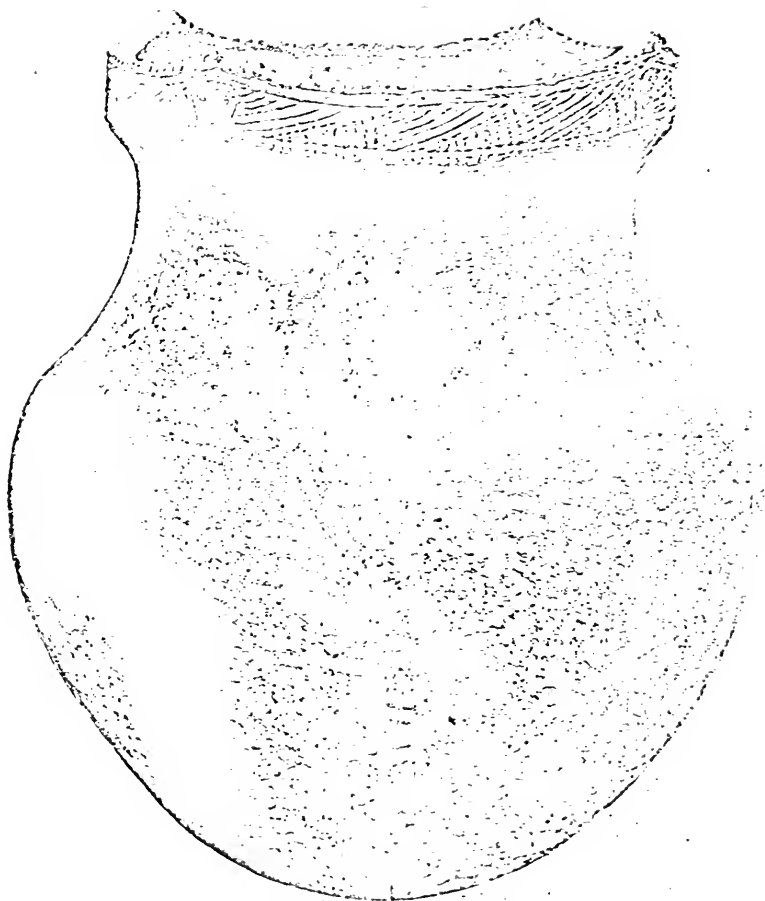
Typical Iroquoian pottery is known both by its shape and by its decoration. The typical pot (pl. xvii) has a globular body that as it turns inward toward the top, turns upward and outward into a constricted neck, and a flaring or overhanging collar respectively. The width of the neck at its base is about one sixth of the circumference of the body and it rises as if from the top of an imaginary hexagon drawn inside the globe. From the top of the neck, which turns outward like the bell of a trumpet, rises a collar, sometimes round but as often four-sided and having an upward turn at each corner. This collar is frequently decorated by a series of triangles within which have been drawn lines close together and parallel with one side of the triangle (pl. xviii). These triangles contrast with one another as the parallel lines slant obliquely, either right or left, in the adjacent space. At the corners figures are often drawn having three round dots punched in to make a conventional human face (eyes and mouth.). In a few instances the face stands out in effigy, or an entire human figure more or less conventionalized is drawn.

There are instances where these triangular parallel lines are absent and where the overhanging collar is rare. Certain of the earlier forms of Iroquois pottery have very little of this lined decoration as in the case of that of the Ripley site. In other cases as at Burning Springs,¹ the Gerry village,² and at the Reed fort³ the incised lines appear, but they run in wider patterns and far down the wide neck, which is not so constricted as in the Mohawk valley forms. Another variation is that of a globular squatty bowl with a short neck which turns outward in a rim that is notched, indented, knobbed, or scalloped. This type is found on the Silverheels

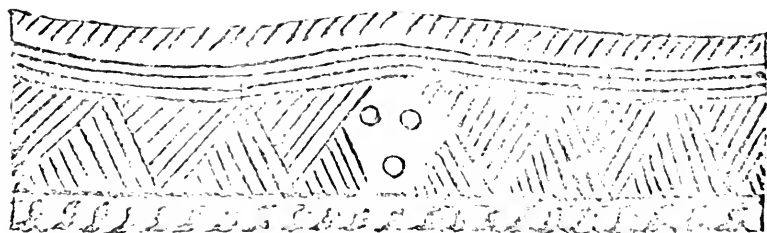
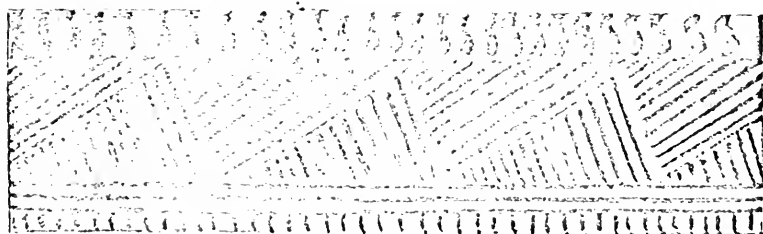
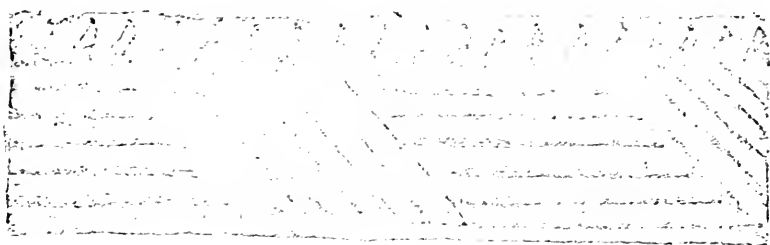
¹ At the mouth of Big Indian creek, Cattaraugus county.

² Chautauqua county, see *Report State Museum*, 1907, Albany, N. Y.

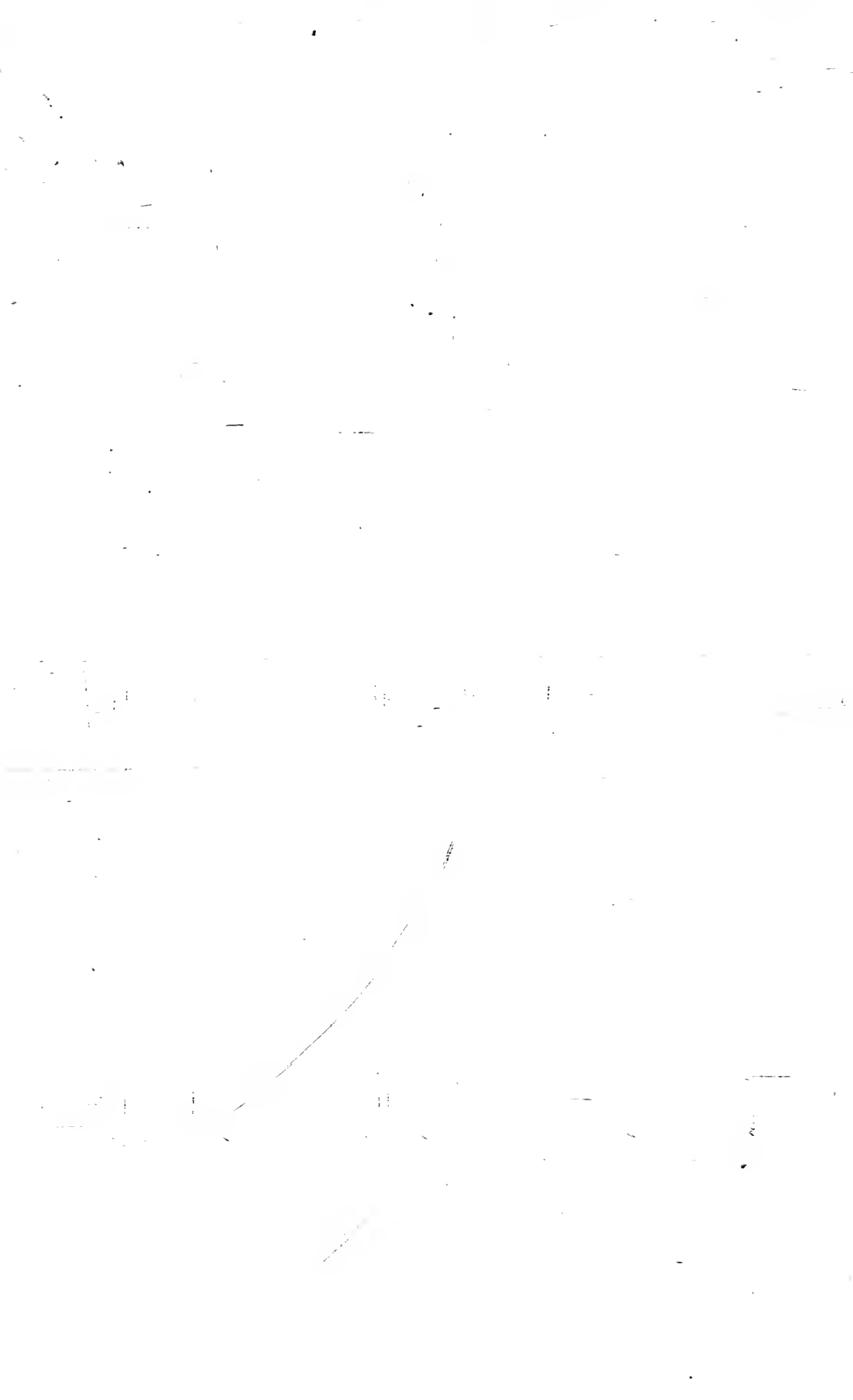
³ Near Richmond Mills, Ontario county.

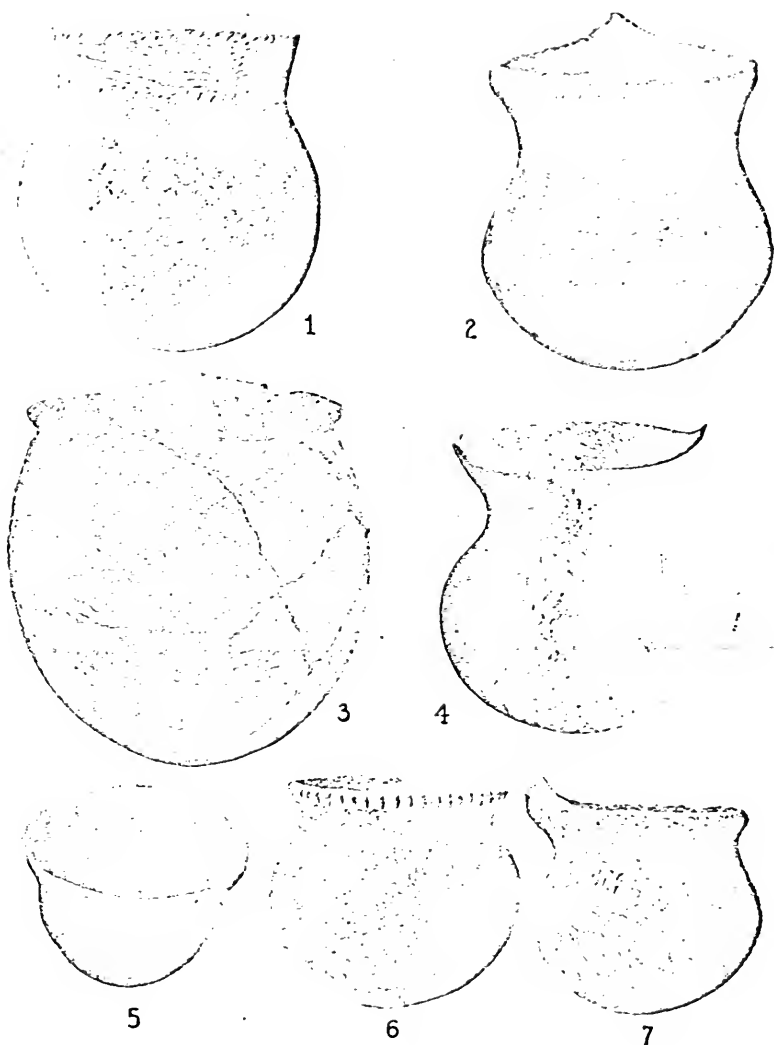


TYPICAL IROQUOIS VESSEL FOUND IN A ROCK SHELTER ON THE INDIAN RIVER, JEFFERSON COUNTY. THE HEIGHT IS $14\frac{1}{2}$ INCHES

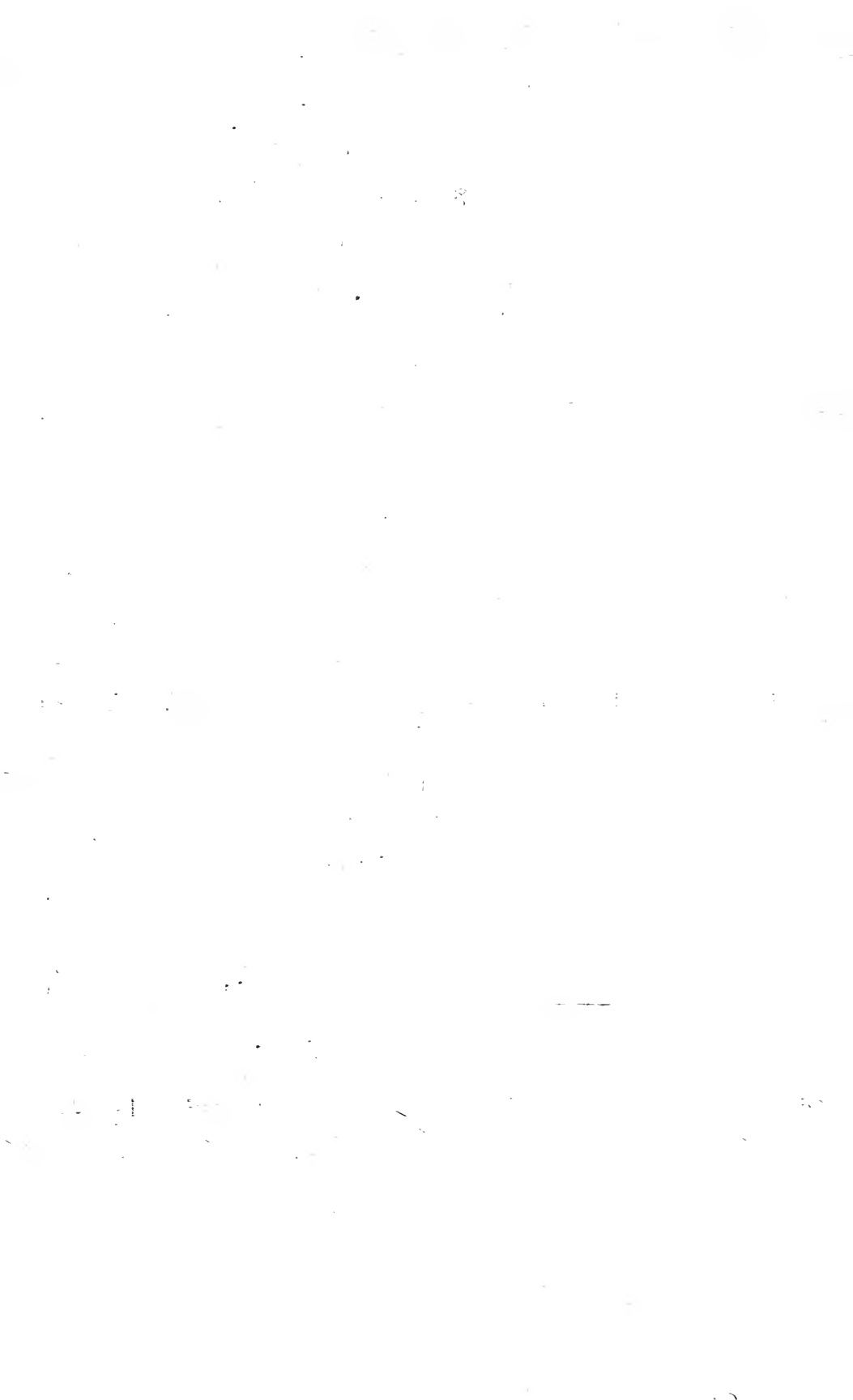


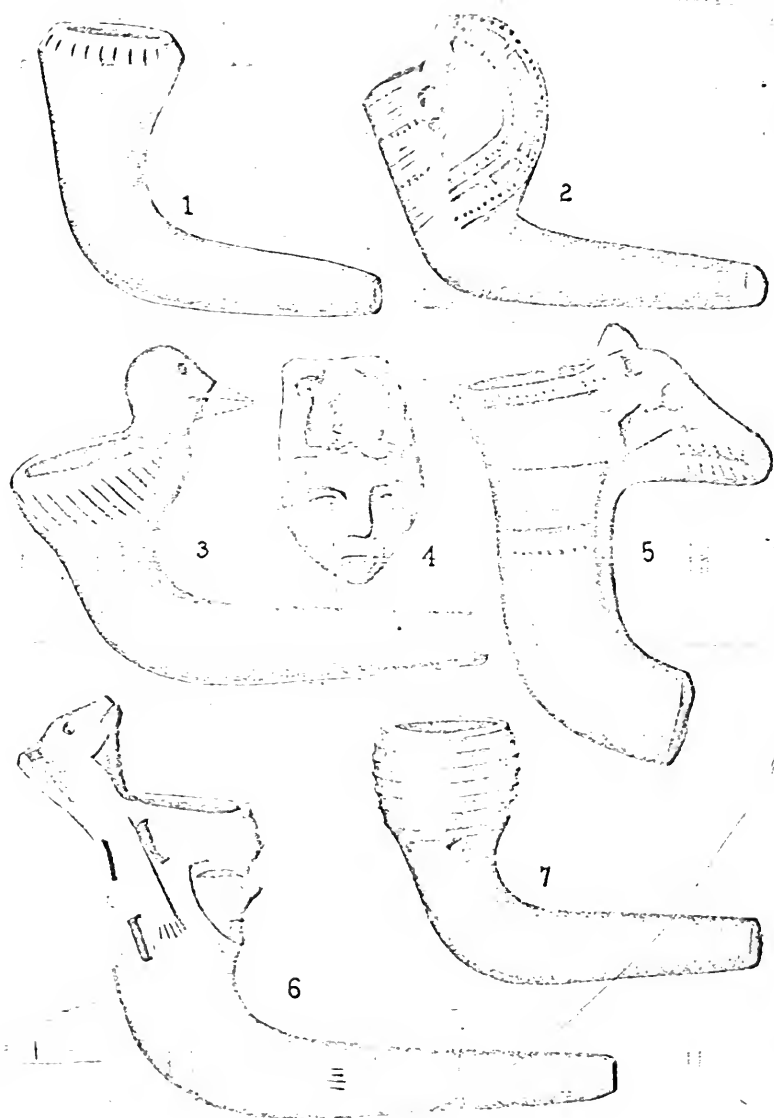
POTTERY DESIGNS THE BAL OF THE ONONDAGA, MOHAWK AND ONEIDA. THESE ARE THE DECORATIONS ON OVERHANGING COLLARS



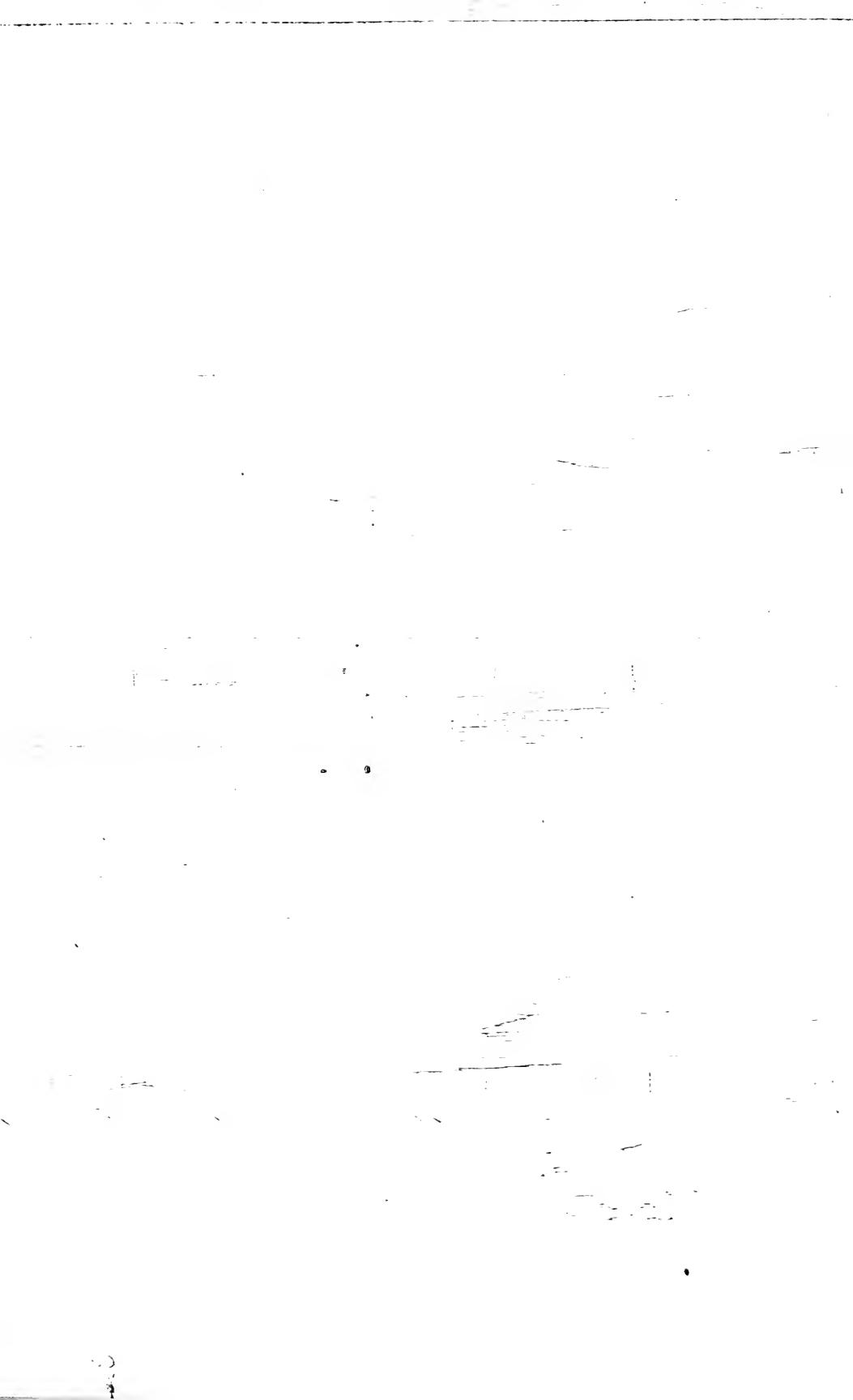


IROQUOIS POTTERY VESSELS. COMMON BUT NOT USUALLY RECOGNIZED AS IROQUOIAN.
 1. SENECA VESSEL WITH WIDE COLLAR WHICH DOES NOT OVERHANG. 2. ERIE POT WITH
 PITCHER NOSE. 3. SENECA POT DECORATED OVER ENTIRE OUTER SURFACE. 4. ERIE
 POT SHOWING MARKS OF SMOOTHING TOOL DRAWN FROM RIGHT TO LEFT OBLIQUELY.
 5. SENECA BOWL. 6. NOTCHED RIM SENECA VESSEL. 7. ERIE BOWL SHOWING SCRATCHES
 OF MODELING BRUSH





TYPICAL IROQUOIS CLAY PIPES FROM NEW YORK. 1. TRUMPET-SHAPED PIPE COMMON IN THE EARLY ONONDAGA AND ERIE SITES. 2. "MOON" PIPE FROM PREHISTORIC ONONDAGA SITE. 3. PIPE BOWL WITH BIRD HEAD EFFIGY, FROM A SENECA SITE. 4. FACE FROM AN ONEIDA PIPE. 5. EFFIGY PIPE, ANIMAL HEAD, ONTARIO COUNTY. 6. EFFIGY OF MAN'S HEAD WITH SKIN ROBE DRAWN OVER HEAD AND SHOULDERS. GENESEE VALLEY IROQUOIAN SITE. 7. TYPICAL SENECA PIPE FROM WESTERN NEW YORK



site,¹ the Gus Warren site near West Bloomfield and in Pennsylvania, as at White Haven. A few Iroquois pots had pitcher noses (pl. XIX). Some of these have been found near Buffalo, at Ripley, and in Jefferson county near Watertown. The pitcher nose may or may not be a development from one of the four corners of the square-topped type. Other pots have small handles that unite the collar with the neck or body of the vessel. Such have been found on certain sites near Buffalo, at Ripley, and in Jefferson county. More have been found in the latter place than elsewhere. Now and then seemingly aberrant forms are found. At Ripley bowls were found that differed in no way from those found in the mound-builder villages of Ohio. They bear no resemblance to any known Iroquois type, but have a rather long, oval body with a wide, flaring mouth. Some were low and like a modern bowl. The surface was scratched and roughened in pseudo-fabric lines or scratched with a twig brush. Two or three peculiar bowls were found on the Dann site near Honeoye Falls, that approximate certain Missouri forms. The bowls are squat, with a wide flaring mouth. Three or four flattened handles unite the under side of the lip with the body of the vessel. The flattened handle is unique on this site, which however, yields European objects.

Pipes.—Equally, if not more striking than the pottery vessels, are the clay pipes. These are usually gracefully modeled and have stems from three to ten inches in length. The general base line of these pipes is one that follows the line formed by the forefinger and thumb, when the thumb is extended at right angles to the hand and the ball turned back. This is the lower line of the trumpet pipe, for example (pl. XX). Iroquois pipes sometimes have bowls imitating the tops of pots. In other instances the bowls imitate the bodies or heads of birds, mammals, or snakes. Many have the chevron pattern, or parallel lines, arranged in triangles about the bowl top. Some of the forms widely found throughout the Iroquoian area are; the trumpet form, the square-topped flaring bowl, the cylindrical bowl having a wide collar decorated with parallel rings, the bird body with the bowl in the bird's back, the effigy of a

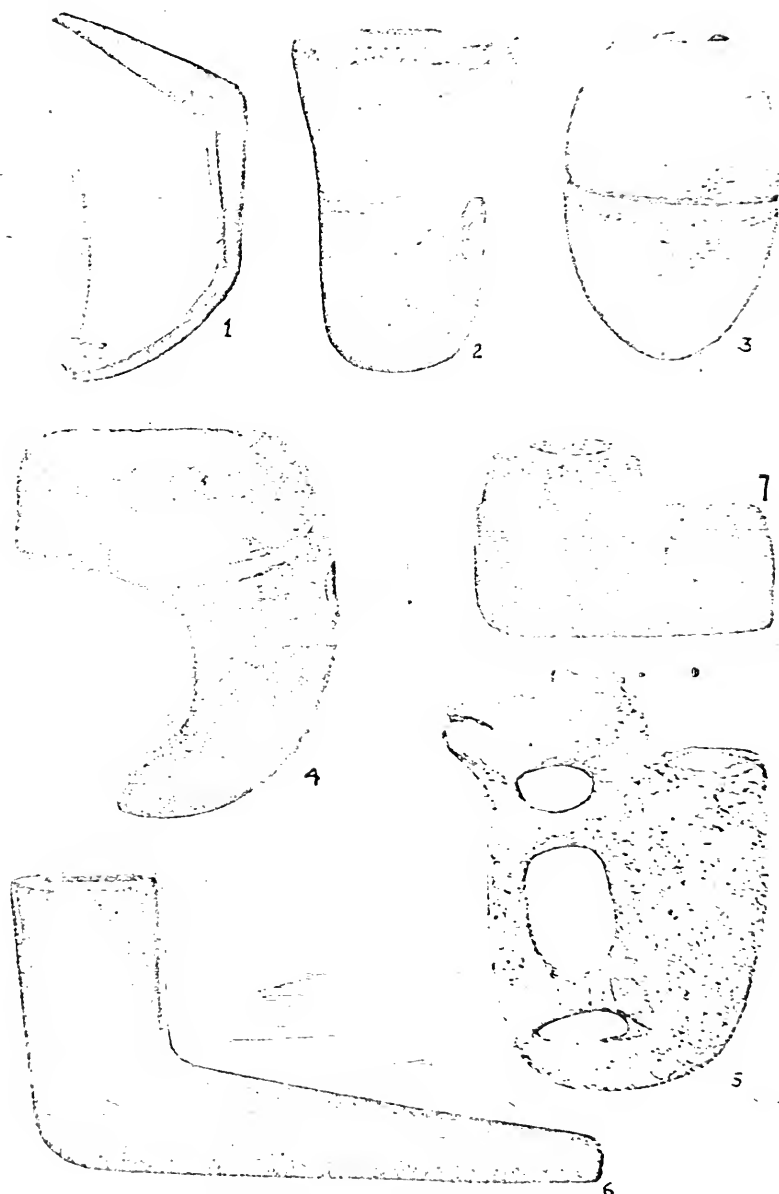
¹ On the Cattaraugus reservation, Erie Co., N. Y.

man with his hands to his mouth blowing through his lips, animal heads as of the bear, raccoon, or fox, and pipes having a human head modeled on the bowl (pl. xx).

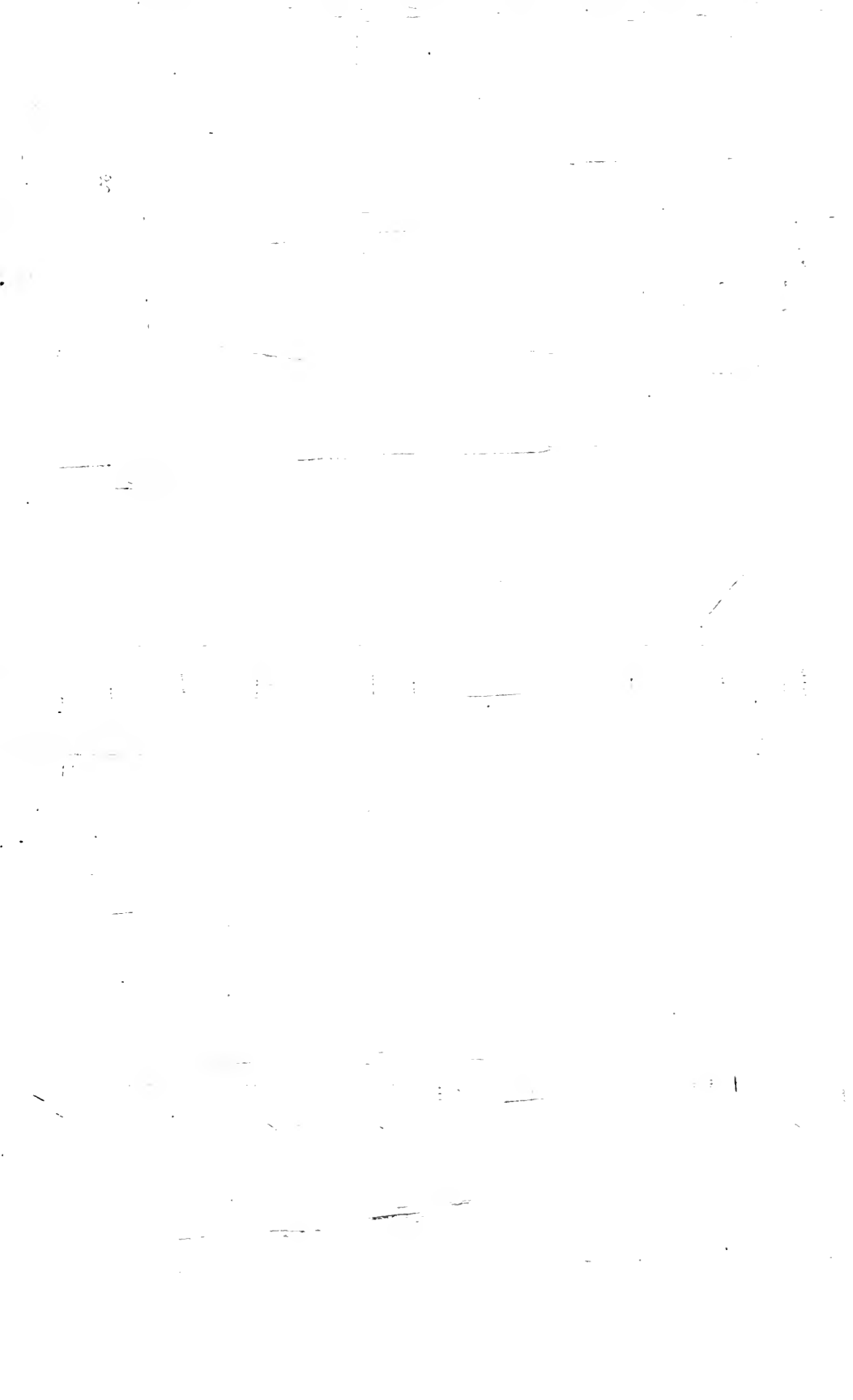
Pipes of stone (pl. xxi) sometimes have stems carved with the bowl, but these form the minority in collections. Some resemble the outlines of simple clay pipes, others do not. Some bowls are oval, some are vase or urn-shaped. More elaborate forms resemble bird bodies, as the owl, or represent a lizard, or other creature crawling over an oval or bowl. Several observations may be made concerning Iroquois stone pipes. A negative remark is that none are tubular and none have the monitor base, common in the mound-builder region. *Iroquois stone pipes in general are so unlike their clay pipes that they bear no resemblance of having been made by the same people.* The outline, decoration, modeling, and size differ, even though found in the same grave or village site with clay pipes. Stone pipes of all the forms mentioned are found in prehistoric Iroquoian sites as well as those of the late colonial period, so that their form and use may be regarded as stable and widely known.

Bone Implements.—Among the most common bone articles are bone awls of all forms and cylindrical bone beads. The latter are usually made of hollow bird bones and many are beautifully polished. There were bone needles and shuttles. Bone phalanges cut or ground on one side or shaped as cone-pendants, are found in abundance. The canine teeth or tusks of bears and wolves perforated for suspension seem to have been favorite decorations, and the much prized elk tooth is found. Bear teeth were ground sharp for knives or scrapers, and beaver teeth were shaped for scrapers. The molars of the bear were ground down and with one root cut off, were shaped like a human foot. Perforated disks cut from the human skull were also used, but human bones outside of this were not employed.

In certain early sites, as on the Reed farm, near Richmond Mills, bone scrapers or beaming tools are found made from metapodial bones of deer or elk (pl. xxiii). These are similar in every way to those found in certain Ohio sites not Iroquoian. They are not found in later Seneca sites.



IROQUOIS STONE PIPES FROM AN ERIE SITE, BUT SIMILAR TO OTHERS FOUND THROUGH-
OUT THE IROQUOIS AREA



Bone implements are commonly found in Iroquoian village sites, especially in ash and refuse heaps or pits. The ashes seem to have acted as a special preservative.

Miscellaneous Bone Objects.— Among the more striking implements of bone are bone combs (pl. xxii), the earlier forms resembling a modern fork and having only three or four large teeth, perhaps one-sixteenth of an inch in diameter or more. The tops are usually plain, although in a few instances there is a simple perforation. As the colonial period is approached the combs become wider and have more teeth. Decoration at the top is at first simple and generally entirely lacking. With the coming of cutting implements of steel, combs take on an entirely new form, resembling in general motive a lady's back comb of modern times. These have from fifteen to twenty teeth, generally two inches long, above which rises a decorative top or handle upon which is fretted out the effigies of various birds or the human figure. Combs of this character are found in many of the sites of the middle colonial period.

Small effigies of animals were sometimes cut out of flat bone and larger effigies of the human figure were carved from heavier bone (pl. xxii). Some of these are apparently pre-colonial. The modern Seneca say that their ancestors carved small images of the human figure to represent a witch and by placing them in bags or other receptacles were able to prevent the evil influence of the witch after whom the effigies were named.

The carapace of the tortoise or box turtle is commonly found in graves and fragments are sometimes found in refuse pits. Sometimes the shell is perforated with seven or eight holes. These may have been used either as knee rattles or as hand rattles, carried in some of the ceremonies.

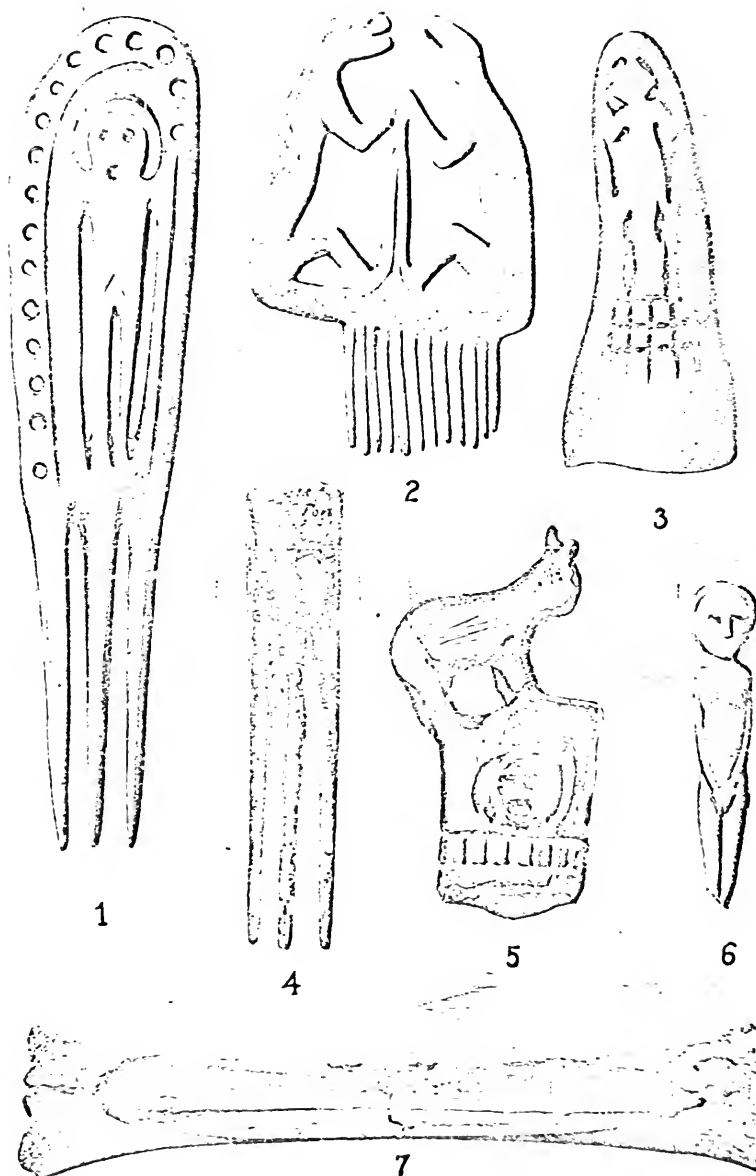
It is not uncommon to find arrowheads of both bone and antler; and it is quite likely that the Iroquois used projectile tips of this material wherever possible. It is said by the modern Seneca that some of their arrows were headed only with a sharp point formed directly on the shaft and hardened by semi-charring. Harpoons were made of bone and sometimes there are several barbs quite unlike, however, the barbs in the European spear.

Fishhooks were of the simple hook type without a barb and resemble in every way the fishhooks found in the Ohio village sites, as at Madisonville. Occasionally bone whistles are found made from the long leg-bone of some bird or of the wing-bone of a wild turkey.

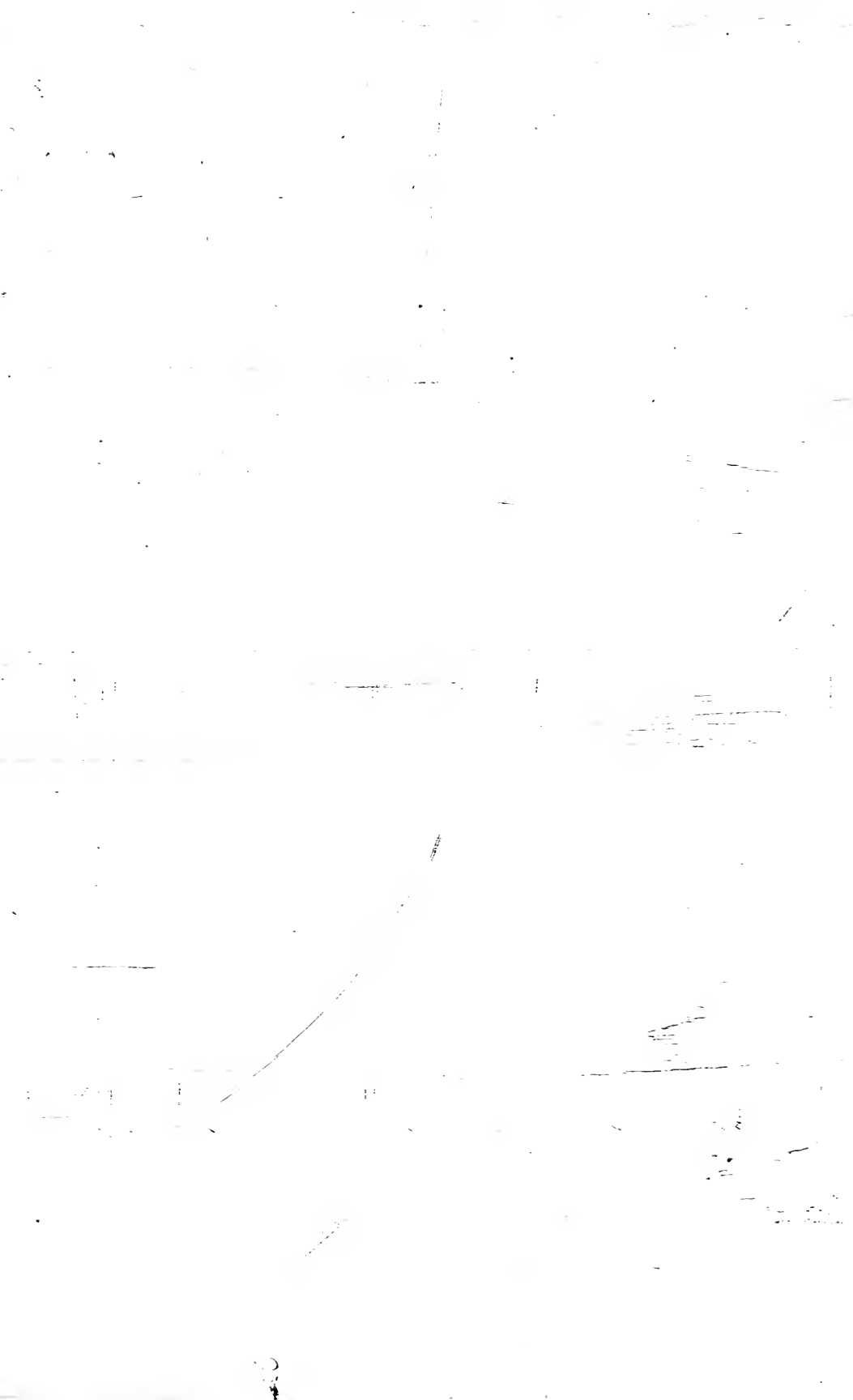
Earthworks.—No adequate idea of the prehistoric Iroquois can be acquired without some description or mention of their earthworks. Scattered through the western and northern portion of the State of New York are more than one hundred earth embankments, ditches, and circular enclosures. Most of these were probably not erected in any sense as earthworks but simply as the base for a stockaded wall. Tree trunks from fifteen to twenty feet high were trimmed off and planted from six inches to a foot deep in a shallow ditch in the top of the wall and the earth was packed in about them. The tops were further secured by being tied together with bark ropes and withes. There are good historic descriptions of these palisaded enclosures. The area within them ranges from one eighth of an acre to more than seven or eight, and it is supposed that they contained fortified villages or were places of refuge from both human and animal enemies. They do not differ in any way from the stockaded enclosures of the province of Ontario, in the Huron-Iroquois area. In some instances they do not materially differ from the earth enclosures found throughout Ohio. It may be said, however, that none of them are so extensive in size as such works as Fort Ancient, nor, except in rare instances, are the embankments more than three or four feet high.

There are three general forms of the stockaded enclosure.

The first, the hilltop stronghold, was naturally fortified on all sides and had the narrow neck, which connected the out-jutting hill with the general terrace of which it formed a part, shut off with a palisaded wall. Deep ravines on either side brought natural protection from sudden onslaught of enemies; and the places were rendered further secure by having the neck protected by a stockaded wall and perhaps an outer ditch. The ditch served two purposes. It afforded the material out of which the wall was erected, and it made it more difficult for the enemy to climb the stockade or to set



IROQUOIS BONE AND ANTLER OBJECTS. 1. EARLY IROQUOIS COMB. 2. SENECA COMB OF THE COLONIAL PERIOD. 3. ANTLER KNIFE HANDLE. 4. PREHISTORIC IROQUOIS COMB. 5. ONEIDA KNIFE HANDLE. 6. BONE DOLL OR FIGURINE. 7. BONE BEAMER MADE FROM METAPODIAL BONE OF ELK. FROM PREHISTORIC SENECA SITE



fire to its base. Typical hilltop strongholds are those at Ellington, Chautauqua county; the Reed fort near Richmond Mills, Ontario county; the fort near Portage in Wyoming county; and the pre-historic Mohawk site at Garoga.

A second form of protected enclosure is irregular in form and follows somewhat the natural line of the ground. It may or may not be upon a hilltop. Examples of this form are found on the Atwell site, near Cazenovia; the stockade near Livonia, Livingston county, known as the Tram site; and near Macomb, St. Lawrence county, on the farm of William Houghton, near Birch creek.

A third form is an enclosure more or less circular in form with a low wall and shallow outer ditch. Examples of these are such enclosures as are found at Oakfield, Genesee county;¹ at Elbridge, Onondaga county, where there is a circular enclosure covering about three acres of ground; or the circular fort on the Lawrence farm in the Clear creek valley, near Ellington.

Usually within these enclosures pits are found in which refuse had been deposited or corn stored. The soil shows more or less traces of occupation and occasionally graves are found in one portion. Beside the choice of the spot as a natural defense there were other considerations, such as proximity to good agricultural land which, for primitive people with inadequate tools, must be a light sandy loam, a plentiful supply of water, nearness to the proper kind of timber, and a location near a trail or stream navigable for canoes. It is not easy to determine, however, why some localities were chosen, for they are overlooked by hills from which the enemy could assail the fortification, or are situated in swamp lands. There were probably many considerations that attracted the Indians to these spots that have been obliterated with the destruction of the forests.

The earlier sites of this character in the Iroquois district in New York were upon the hilly lands south of the Great Lakes; and it does not appear that the Iroquois came down from their hilltop strongholds except in few remote localities until about the beginning

¹ These enclose about ten acres of land and were described by Squier, fig. 8 in his plate.

of the historic period when they began to build their towns on the lowlands, nearer the shores of lakes Erie and Ontario. This observation is especially true in western and central New York but does not fully apply to the Iroquoian area in Jefferson county. It is quite likely that the Iroquois did not drive out all their enemies or take full possession of this territory until a short period before the opening of the colonial epoch. An example of village sites or earthworks, upon or near the lake shores are those found at Ripley, Chautauqua county. Most villages, however, were from ten to twenty miles back from the shores of Erie or Ontario.

Mortuary Customs.—There seem to have been several methods of disposing of the dead. Many human remains are found buried beneath the ground indicating that the body was intact when interred. Traditions and historical evidence point out also the custom of placing the body wrapped in blankets or skins in the branches of large trees; and there are preserved in the Seneca tongue, the various terms employed to describe the details of this type of burial. Burial houses were also erected in which the bodies of the dead were placed until decay had reduced them to bones. For the disposal of these bones research shows that they were gathered up and buried in bundles in separate graves. Sometimes several skeletons are found in bundles in a single grave, with or without accompanying relics, such as pots, flints, pipes, etc.

The Iroquois, especially the Neuter nation, the Huron, and perhaps the Erie also, had ossuaries in which from ten to fifty or one hundred remains were placed. Few relics are ever found in ossuaries of the earlier period. In the individual burial, where the body was placed intact in the grave, the skeleton is almost invariably on one side with the knees drawn toward the head near which the hands rest. This position is that assumed by a sleeping person, drawn up to keep warm.

In the earlier graves there are few material objects found, but as the time ranged into the colonial period more durable relics are found, showing the gradual growth of prosperity and a greater abundance of material property. The burial objects that have survived the elements are clay pots, clay and stone pipes, flint

objects, such as knives, triangular points, celts, bone objects, shell objects, etc. These are usually found near the chest, hands, or head. Among the hundreds of Iroquois graves and skeletons found by the writer not one has been found "sitting up" and among the

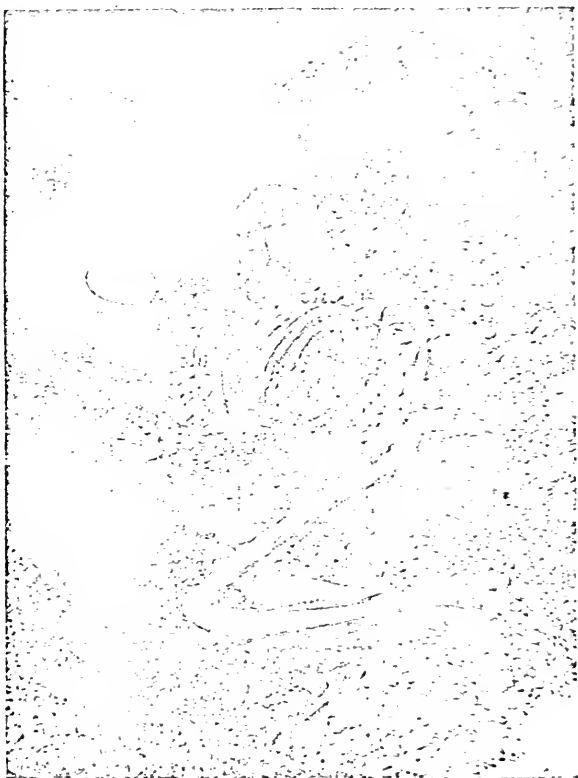


FIG. 55.—Typical Iroquoian burial, showing position of pot and pipe in grave.

thousand or more burials of all cultures discovered, none were sitting up nor did the bones "crumble upon exposure to the air." The Iroquois had no definite orientation for the grave, no special side, the only general rule being the flexed position, reclining on one side (fig. 56).

The predecessors of the Iroquois had also this rule, though the makers of the stone graves in New York generally placed their dead lying straight on the back.

Miscellaneous Observations.—The Iroquois did not use vessels of steatite, but their carved wooden bowls of the longer type were fashioned like them in the sense of having handles or lugs at each end.

Iroquois textiles have never received a careful study (for they are little known), but they did weave nets, bags, belts, and even shoes. Their corn husk sandals differ a little from the sandals or moccasins found in the caves of Missouri. Small fragments of cloth and woolen bags prove that they understood weaving and basketry.

The Iroquois carved wood, and indeed the confederate Iroquois law required that the national feast bowl should represent a beaver. The idea of making receptacles resembling animals with their backs or heads hollowed out was common. Their wooden spoons had bowls shaped like clam shells and at the top of the handle was carved a bird or animal strikingly like those they modeled on pipes.

The Iroquois were an agricultural people and village dwellers. Early Iroquois villages were on hills overlooking valleys and were stockaded. The early villages had earth rings about them and sometimes an outer ditch. Upon this ring or wall of earth the palisades were erected. Later villages were in the valleys beside lakes and streams, and were not stockaded. The Iroquois towns of the sixteenth and seventeenth centuries were, in increasing numbers, without such walls. The Iroquois did not build mounds of the character known throughout Ohio or Wisconsin, at least at the time when they used the pottery and pipes we have described.

Iroquois houses were of bark, and there were large communal dwellings. Many of them held from five to twelve families or more. They had either a rounded or pitched roof with openings at the top, as a vent for each fire beneath. The Iroquois did not ordinarily employ the conical skin tipi.

The permanency of their village life is indicated in a measure by their vast fields of corn and other vegetables. Agriculture exercised an immense influence over their national life, and it was pursued with method and on a large scale. There are accounts of expeditions sent out to procure new seeds and vegetable foods.

The Iroquois system of consanguinity was matriarchal. There were various clans having animal symbols and names. The women nominated the civil sachems and could veto the acts of the tribal council.

Cosmogony.—The Iroquois cosmogony relates that a pregnant woman fell from the heaven world. She fell upon the back of a great turtle and gave birth to a female child. This child grew quickly to maturity and gave birth to two sons, good-minded and evil-minded, or more properly, Light one and Dark one. The Light or shiny one molded man after seeing his reflection in the water. He found his father dwelling on the top of a mountain that rose from the sea "to the east" and begged from him certain gifts tied up in bags which were given. Reaching his home land again, he opened them and found animals and birds of all kinds, trees and plants. The mother of the two boys died in giving them birth, killed by Dark one or The Warty (Flinty) one, who insisted on emerging through her armpit. The grandmother nursed the boys and bade them watch their mother's grave. The food plants and tobacco sprang from her grave. The sun and moon in other versions were made from her face, eyes, and limbs.

Nearly all Iroquois legends relate to incidents connected with the southwest. Many expeditions relating to the country down the Ohio river are recounted. Few stories of the north are related. The north was only the land of great terrors and savage giants.

THE COMPARISON OF THE IROQUOIAN CULTURE WITH THAT OF SURROUNDING TRIBES

As has been seen in the foregoing description outlining the material culture of the Iroquois, there are certain definite things which characterize their handiwork. The Algonkian tribes to some degree, erected earthworks or stockaded enclosures but apparently of far less extent than the Iroquois. In this respect the Iroquois more closely resemble the Indian of Ohio and the southern states. With the exception of the size and height of the embankments their earthen walled enclosures do not greatly depart from certain Ohio forms. The Iroquois, however, in no sense erected mounds of the

character found in Ohio, neither does it appear that they were numerous enough to require, or to be able to erect, such extensive earthworks. A greater number of these enclosures are found in New York, west of the Finger Lake district and on the hilly regions of Chautauqua, Cattaraugus, Erie, Wyoming, Genesee, Livingston, and Ontario counties. A few are found eastward as in Jefferson county, but a great majority are in the localities we have mentioned.

The Iroquois were an agricultural people like those of the south, of Virginia and Georgia, or of the mound district in Ohio and the Ohio valley. Corn cobs and other vegetables are frequently found in ashpits and refuse heaps in Iroquois village sites, and the use of tobacco may be deduced from the prevalence of smoking pipes.

Unlike the Indians of Ohio who built the mounds and fortifications, or the southern Indians, those of Georgia and Alabama, or the Algonkian east and north of them, the Iroquois did not use implements or ornaments of copper or mica; neither did they use ornaments of polished slate such as gorgets, stone tubes, bird stones, boat stones, and banner stones. They did not use the bell pestle or cylindrical pestle, nor as a rule did they ornament their pottery with fabric marks, notwithstanding the fact that they wove fabrics similar to those the impressions of which are found on baked pottery in the Algonkian area. They did not use the grooved axe, common among all the peoples about them, nor did they have the monitor pipe commonly found in Ohio, Kentucky, the southern states, and throughout New England. Except in rare instances, they did not use flints having barbs and stemmed necks. The absence of these forms of implements is significant and is the result of something more than mere accident. The Iroquois had every opportunity of knowing of such objects and they were fully capable of making them had they so desired. It appears from these facts that the Iroquois deliberately chose not to use these things and tabooed their being employed in any way. Apparently there was a direct attempt to banish such articles beyond the pale of their culture by deliberate avoidance. On the other hand the Iroquois did use stone tomahawks or celts, and apparently mounted them in

the same manner as did the contiguous nations. They did use the ball-headed wooden war club such as is widely found throughout the continent; and their shallow mortars and mullers did not greatly differ from those used by the Algonkian.

Their dwellings were houses of bark formed much like an arbor, some with round and some with pitched roofs. Under normal conditions these houses were communal dwellings and large in size. There were no permanent dwellings circular in form; and mud huts or hogans were not used. It is quite apparent that from the earliest times they were an agricultural people, and neither archeology nor the testimony of early explorers and travelers indicates any wide difference in their village life from that of the Indians of Virginia and the Carolinas, for example. They relied very largely upon vegetables for their sustenance, and the cultivation of the ground was regulated by certain established customs. It appears that the Iroquois were far more like these Indians of the middle south in their village life than such Indians of the north as the Micmac or the Malecite.

Of great importance in the study of comparative archeology, and we believe in the study of the origin of the Iroquois, is the testimony of implements of pottery and smoking pipes. Iroquois pottery is perhaps the most durable and striking of the material found on their village sites or in their graves, and in both decoration and form is distinctive from most forms of pottery used by the Algonkian. Before discussing this subject further it may be well to state that there are two general forms of Iroquois pottery, that is to say, there are two archeological districts which yield pottery, which may be compared. The first and westernmost is the Huron-Erie area which embraces the Iroquoian sites in the Niagara peninsula, in Ontario and the adjacent land to the west of it and north of Lake Erie, including also the territory in New York along the southern border of Lake Erie to the hilly land south of it. The second area is the Mohawk-Onondaga, and takes in the region of the St. Lawrence basin, the east shore of Lake Ontario, the south shore of the Oswego river southward along the Seneca river, southward through the Susquehanna valley, and eastward through the Mohawk

valley. In the first district named the outline of the pot does not show the high collar projecting as far from the neck as is common in the second district. In many cases the collar is a very narrow band and ornamented by parallel lines, simple oblique lines or none at all (pl. xviii). In another variety the lines are formed in the chevron pattern but in larger plats. In this form the collar does not project very much from the body of the pot and the decoration is carried down well onto the neck. There are instances where the triangular patterns and short lines follow a line of oblique lines drawn around the body of the pot below the rise of the neck. Such patterns are found on the vessels from Ontario and figured by Dr. Boyle, and by myself at Ripley, Chautauqua county. In the second district the wide overhanging collar becomes almost a fixed characteristic. Here it reaches the highest form of its special development and archeologists usually describe one of these pots for their ideal Iroquoian form. The pots in the first-named district usually have the more squat body with bulging sides (pl. xix). A careful comparison between the pottery vessels found by the writer at Ripley, N. Y., and those pictured by David Boyle as having been found by the Laidlaw brothers, in the sites along Balsam lake, Ontario, Canada, will show that while a general outline and form of body is similar to the pottery of the Mohawk-Onondaga area, there are differences enough to warrant placing each district in a class by itself.

Certain forms of Iroquoian pottery, as in western New York, do not greatly differ from those discovered in the mounds of Ohio, especially certain pottery forms described by Prof. Mills, of Ohio State University. The forms to which we refer are those having a globular body and short neck with a wide flaring mouth; the entire surface of the body being decorated with the marks of a paddle wrapped with grass stems or brushed while still plastic with the same material. Large fragments of such pottery were found by the writer in the prehistoric site at Burning Springs where it was mixed with sherds of more conventional Iroquoian types. Some of this pottery does not differ materially from certain forms of Algonkian pottery except in the matter of shape. None of the

pointed bottoms are found in the Iroquoian district in New York. Many Iroquoian vessels are small, containing not more than two quarts, while others are larger and have a capacity of several gallons. Complete vessels of the larger type are very rare but many hundreds of sherds of large vessels are found throughout Jefferson, Ontario, Erie, and Chautauqua counties.

In the study of the design found on the typically Mohawk pottery it seems apparent that the parallel lines arranged in triangles represent porcupine quill work such as is found on the rims of bark baskets. There are certain other features of Iroquoian pottery that lead one to believe that potters in making their vessels had in mind bark baskets. Neither the square topped nor round collar is dissimilar in form to the tops of the bark baskets and the dots or short oblique lines placed around the upper edge seem to imitate the binding of the wooden rim of the basket. Oftentimes dots around the center of the body, at the beginning of the neck, seem like the stitch marks seen on bark basketry. This idea was first advanced by Frank Cushing who gives a figure of an Iroquois basket which he says was copied in clay by potters. We believe that the *idea* is correct, but the Iroquois of historic times did not use bark baskets or vessels of this character. All of their baskets that we have seen have flat bottoms and in outline are more or less oval at the top.

Other pottery patterns, such as those found throughout the Seneca district and western New York, have a narrow rim, on the lower side of which is a series of notches or projecting teeth. Sometimes this rim is devoid of these projections and has oblique parallel lines drawn at intervals to the edge of the rim. This form is similar to the ordinary bark basket simply bound with an ash splint and an elm bark tape. It is of value to note for comparative purposes that the quilled or chevron pattern is far more prevalent in the Mohawk-Onondaga district than it is in western New York or in the Seneca-Erie region.

It is of great importance to note that Iroquoian pottery never has a circular or scroll-like design such as is found upon the pots of the south and of certain Ohio village sites. The absence of any

curved decorations or scroll designs is significant, and is one of the things which points to a deliberate attempt to avoid the distinctive art of certain other tribes.

All Iroquoian pottery seems to have been built by the coil process, that is to say, it was formed by coiling ropes of clay upon a base and then worked into the desired shape by continuing the coiling process. Very few pots were blackened by pitch smoke although some pipes were treated with this process.

Smoking-Pipes.—Smoking-pipes of both stone and clay are numerous in the Huron-Iroquois area. There are several general forms but all bear striking resemblance to each other. We have given some description of these in a former paragraph.

The Iroquois pipes seem much different from those found in any other archeological area, and it does not appear at first thought that they were derived from any other forms except perhaps the small tubular form with its end bent upward at an angle. There are certain features, however, found in Iroquois pipes that remind one of pipes of the contiguous tribes. It will be noted that the monitor pipe of the mound-builder region has a bowl which resembles an oval vase with a flaring rim. The bowl is set down into the platform, the whole pipe of course being monolithic. The Iroquois did not use the platform pipe, as we have previously remarked, but they did employ every form of the stone bowl used on platform pipes. The bowl, however, was built in all its lines much like the monitor type but submerged into the platform stem. The same remark applies to certain forms of effigy pipes where the bowl has an animal head projecting from it. Certain forms of Iroquois clay pipes have similar bowls but with a stem of the same material projecting from it. The Iroquois did not have anything identical with the mound types with their beautifully formed effigies of complete birds, toads, frogs and small mammals, such as are featured by Squier and Davis.

There is one important exception to this statement, and it is that relating to the cruder form of effigies found on platform stems. On early Iroquois sites effigies of this kind are found in the so-called lizard or panther pipes. The platform, however, has disappeared

and the bowl and the effigy have a different orientation. The effigy seems to have clung to a narrow strip of the platform which appears in the shape of a small stem, and the stem hole is drilled in the back of the effigy, the bowl of the pipe being drilled down through the top of the shoulders into the body of the effigy. The drilling shows in most cases a large conical or beveled hole. Other effigy forms show no traces of the platform or rod, as in the case of the lizard pipes which perch upon their own tails, but are conventionalized forms of birds, generally the owl, having the body at the shoulders drilled for a bowl and the stem hole drilled in the lower part of the back. Oftentimes in the front of the pipe a conventionalized projection is made to resemble the feet. These bear a perforation from which, no doubt, were suspended ornaments. Other forms of mound pipes used by the Iroquois without any alteration are those from the Erie region resembling animal claws and those modeled along cubical lines with a short stem base for the insertion of a reed. Iroquois and mound pipes interpreted and compared in the light of these observations show in general conception a remarkable similarity. They are more alike than are the pipes from the southern states or the Atlantic seaboard.

The stone owl pipe and the lizard pipe, which have been described best by Col. George E. Laidlaw of the Provincial Museum of Canada, are found in the early Iroquois sites in New York and undoubtedly in sites of the same period throughout the entire Iroquois area. The Province of Ontario has yielded many, numbers of them having been found in New York, still others have been found in Maryland and Virginia as well as the Carolinas. Others have been found elsewhere, but only occasionally.

These effigy pipes of the Iroquois in some ways remind one of the Cherokee pipes which have the effigy standing on the front part of the stem. In the Iroquois pipe, however, the stem has been abandoned and the effigy has either "sprung upon" or "grasped" the bowl or made it a part of itself. It is not difficult to conceive that this type might have been derived from either the Cherokee or mound pipes. A single dream of an old woman of the early tribe, widely recounted among the people as a necessary provision

demanded by the spirits, might cause a modification in any line of material culture. We have only to examine the history of the modern drum dance of the Ojibway and middle Plains tribes to discover how a dream can institute a custom that becomes widely known and followed.

Iroquois pottery pipes are among the most interesting forms of their ceramic art and some of the best modeling is found in them. They bear upon their bowls the effigies of birds and mammals, animal heads, human heads, and representation of earthen pots and other objects. They are far more complex and made with greater care than are the Algonkian pipes. Iroquois clay pipes are by far the best made by the aborigines of North America north of Mexico. There are certain features about them that give a hint of the customs and costumes of the people who made them, for example; they show that the skin robe with the animal head still upon it was worn as a blanket and head piece (pl. xx); they give an idea of facial decoration; they represent masked figures with their hands to their lips blowing, as in the false face ceremony, or they reveal their totemic animals. Some of them have numerous human faces modeled upon the stem and bowl, and both the form of the face and the concept is still carried out by some of the Iroquois today, especially the Cayuga, who carved these faces upon knarled roots as charms against witches.

The most common type of pipe among the Mohawk-Onondaga group is that having a flaring trumpet mouth. The Seneca-Erie on the other hand, including the Huron of the north, commonly used pipes having a cylindrical bowl upon which was a long collar decorated by parallel rings.

Certain forms of pipes show how widely prevalent certain concepts were among the Huron-Iroquois. Briefly these are the owl-faced pipe, the blowing pipe with the human face, the ring collar pipe, the square-topped pipe with the flaring collar, the trumpet-bowled pipe, and others. It appears that Iroquois pipes are a unique part of their culture. Further description of these is given in another portion of this treatise.

AN IROQUOIS MIGRATION HYPOTHESIS

For the sake of a working hypothesis and for the benefit of future discussion, we wish to advance a theory explaining the presence of the Iroquois in their present area.

Let us suppose that the one, two, or more related tribes of early Huron-Iroquois lived in a portion of a region included within a circle having a radius of 200 miles and with its center at the mouth of the Ohio river. Here they were in contact with the Caddo, the Muskogee, the Sioux and some of the Algonkian. They were more or less agricultural and sedentary and familiar with village life. They knew how to erect stockades and build earthen walls for their enclosures.

Some movement of intruding immigrants or other influence caused them as a body to push northward up the Ohio river. Some went eastward into the Carolinas but the main body migrated in a northeasterly direction. The tribes of the Cherokee were the first to lead the way and crowded upon the mound-building Indians of Ohio, whom they fought for a long period of time. They finally overcame the Mound Builders¹ and absorbed a large number into their tribal divisions, and possessed themselves of the Mound Builders' country. Very likely they were assisted in this conquest by bands of Choctaw, Algonkian and by some of their own kinsmen.

They took upon themselves some of the characteristics of the Mound Builders, but endeavored to blot out some of their arts, to the extent of mutilating objects they regarded as symbolic of their former enemies.

Other Iroquoian tribes then pushed northward and endeavored to pass through the Cherokee-Mound Builder country. Jealousies arose and the newcomers with the Delaware began a general war against them, finally driving them southward and across the Appalachian ranges. This estranged the two branches and led to wars continuing well into the historic period.

The beauty and fertility of the country attracted settlement, but the Cherokee constantly raided their villages. Bands then

¹ We use this term only as a convenient expression to describe the Indian tribes of the region under discussion.

began to cross the Detroit river and push their way into the peninsula between Lakes Huron, Erie, and Ontario. A band now known as the Huron established themselves near and southward of Lake Simcoe. An allied tribe, the Attiwandaronk or Neuter possessed the region south and east of them, taking the Grand river country and pushing eastward across the Niagara. Still other bands pushed over the northern shores of Lakes Erie and Ontario and fought their way to the mouth of the St. Lawrence.

Powerful bands established themselves about the St. Lawrence, with the site of Montreal as a center. They were Mohawk-Onondaga, though the Onondaga soon pushed southward to the hilly region east of the foot of Lake Ontario, in the present Jefferson county.

Certain bands continued on the south shores of the lakes and pushed their way eastward. One division, the Erie, claimed nearly the entire southern shore of Lake Erie, while the Seneca, pushing eastward, laid hold of the country from the Genesee river to Canandaigua lake. The Conestoga, or Andaste, took northern Pennsylvania, especially the region embraced by the two branches of the Susquehanna, including the Chemung river and southward, perhaps as far as Harrisburg. From thence to the headwaters of the Chesapeake the Susquehannock claimed domain. Still southward, but east of the Cherokee, pushed the Tuscarora and it is possible that bands of them lived there earlier.

There was constant intercourse between the various tribes who were well aware of the seats of each other. Often the various bands were at war one with the other, and often there were loose alliances, as of the Tuscarora with the northern Iroquois. The Cherokee and Iroquois, especially the Seneca, were constantly at war. To the north the chief enemy of the Iroquois was the Adirondack tribe, which later allied itself with the Huron.

The Huron-Iroquois pushed the eastern Algonkian to a narrow strip along the coast separating them from their western kinsmen and exercising a dominant influence over their material culture and to some extent their social organization. The Delaware, who were closely associated with the Iroquois, were always more or less

friendly with them, and, indeed, in the historic period at least, acknowledged the supreme authority of the confederated Iroquois over them.

The raids of the Adirondack or Abenaki of the north, and the hostility of the southern Iroquois at length compelled the Laurentian Iroquois, the Mohawk, Onondaga, and Oneida tribes, to form a compact which later took in the Cayuga and then the Seneca.

The Onondaga, early, had pushed further south, leaving their east Ontario (Jefferson county) strongholds, and occupied the hilly country south of Onondaga lake, in the present Onondaga county. The incursions of the Abenaki made this necessary. The Mohawk soon followed, owing to disagreements with the Laurentian Huron. In their southern migration they came upon the Mohawk valley country where they established themselves; first, on the highlands north of the river, in the present Fulton and Montgomery counties; and later on the southern side of the river. The Oneida band, long a separate body, moved westward into the highlands of Madison county. Still west and on the hills near Limestone creek, were the Onondaga, and beyond them the Cayuga living along the Seneca river and southward about Cayuga lake.

Between these divisions of Iroquois, in spite of a common origin and common stock dialects, there was much jealousy and frequent feuds. In general their southern neighbors gave them too much trouble to leave much time for war between themselves. The Mohawk sent war parties north to harass their foes, the Huron and Abenaki and even the Micmac; but in turn they were disturbed by the Conestoga or Andaste whose Chemung valley settlements made war on the Cayuga also. The Seneca and Erie tribes in the Genesee country and along Lake Erie were in constant contact and perhaps allied for defensive purposes. The westernmost Seneca settlements were especially friendly with the Erie. On both sides of the Niagara river were the villages of the Attiwandaronk, or Neutral, considered an old and parent body of all the Huron-Iroquois. Within one of their villages near the Niagara lived Ji-gon-sa-seh, "The Mother of Nations," a woman who was regarded as a lineal descendant of the "first woman of earth."

The pressure of the eastern Iroquois and the additional power their friendship would give, made the idea of a confederacy an inviting one to the Seneca and a large portion of the nation subscribed to it. The Erie were not kindly disposed toward the idea and the southern Iroquois were not at all attracted by it. The Neutral saw no need of entering the league since they made no local wars and since both their Huron and Iroquois kinsmen respected their ancient authority and the prestige given them by the "Mother of Nations." Thus, the Iroquois Confederacy, or Long House came only to embrace the Mohawk, Oneida, Onondaga, Cayuga, and Seneca. The fact that some of their kinsmen would not join the confederacy was displeasing to the Five Nations, who though dedicating their league to the establishment of peace saw grave danger in their neighbors who refused to subscribe to the articles of friendship. The new confederacy was soon beset with enemies on all sides who saw in its rising influence a general danger. But the confederacy developed certain mental qualities within its leaders who were not to be overwhelmed. They became astute statesmen as well as ferocious warriors. They learned the advantage of concerted action, of compromise among themselves, and of organizing mass onslaughts. Thus nation after nation fell before them, the Erie, the Neutral, the Huron, the Wenro, and the Conestoga. The Cherokee were too far away to be effectively reached. Although the Five Nations lost thousands of warriors, their foes lost more, and the surviving enemy were made captives, led into the Iroquois villages, and adopted. This swelled their ranks enormously and virtually united by blood mixture all the Iroquois.

Triumph did not come to them, however, until the middle of the colonial period, and with this triumph came the golden age of the Five Nations. This was from 1650 to 1755. Before the earlier date their foes had been Indians, and after that date they battled with the white man, it is true, but they lost no power. By 1755 however, the colonists had come in such numbers that the Five Nations saw the end of their ascendancy as an imperial power. They had come, they had conquered, and now they became engulfed in a complex of cultural elements of which their ancestors

never dreamed. More than five thousand Iroquois remain in New York State; more than fifteen thousand reside in the United States and in Canada, but whence they came in the dim distant past, not one remains to tell. The secret may only be solved by the student of Iroquois mythology and of archeology. Our present knowledge, as we have argued points to a southern origin, "down the Ohio."

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THE CHARACTERISTICS OF IROQUOIAN VILLAGE SITES OF WESTERN NEW YORK

By FREDERICK HOUGHTON

STUDY of any Indian village or camp site in western New York shows clearly the fact that it falls naturally into one of three groups, each of which is distinguished by its own type of remains and its own peculiarities of situation. These three groups can be correlated with the occupancy of the territory by three different types of people. One group must be definitely ascribed to people of Iroquoian stock. A second group can be ascribed to a non-Iroquoian people of unknown identity, and there seems to be sufficient evidence to warrant a belief that the third group may be ascribed to wanderers from southern Ohio.

The existence of these different groups, each with its own characteristics, has been recognized by but few archeologists. Mr. Arthur Parker, New York State Archeologist, has repeatedly called attention to the difference in types of the archeological remains in western and central New York. Mr. Wintemberg, now with the Ottawa museum, has commented upon this same difference in the Canadian peninsula. In a study of the village sites of Seneca, Neuter, and other Iroquoian peoples, which I have carried on for the Buffalo Society of Natural Sciences, I have found and noted this difference constantly.

The Iroquoian sites of western New York have received a great deal of intensive study and this study has yielded a large amount of material from which may be derived a standard of characteristics of the culture of various Iroquoian nations, both before and after their contact with Europeans. Unfortunately no such intensive study has been made of the non-Iroquoian sites in the territory immediately contiguous to New York, either in Pennsylvania or Canada. It is true that there exist in both places numerous collections of artifacts found in territory known to have

been inhabited by Algonkian nations, and probably for the most part of Algonkian origin. Some of these collections have been made by skilled collectors yet their work is either unpublished, or else it is published in such form that no definite characteristics of Algonkian culture can be ascertained.

A careful and intensive study of sites well established by history



Photo by Cummings.

FIG. 57.—Artifacts from a refuse heap of a pre-European site in South Buffalo. Iroquoian characteristics are well shown: note the points, the articles of bone and antler, the clay pipes, and the decorations of the potsherds.

to have been occupied by Iroquois has led me to consider the characteristics of Iroquoian sites of western New York to be as follows (fig. 57):

An elevated position with evidences of defensive works.

Refuse heaps and ash pits.

Abundant, small, triangular, chert points.

Abundance of clay kettles and pipes, fragmentary or entire.

Abundant articles made of bone and antler.

An absence of large, notched or shouldered points, and grooved axes.

An absence of artifacts made of steatite, quartzite, argillite or other materials foreign to this territory.

An absence of problematical articles made of slate, as bird stones, gorgets, banner stones, and tubes.

The most conspicuous feature of an Iroquoian site is the black earth which marks its surface. This black earth is usually segregated into spots which are scattered irregularly over the surface



FIG. 58.—A refuse heap on a terrace slope at Belmont. A site occurs on the level ground above it. From it come bone articles, animal bones and potsherds, some of which can be seen in the picture.

of the site, or which mantle the slopes of any nearby ravine. These spots are the remains of the refuse heaps of the village and consist of the decayed animal and vegetable refuse of its houses mixed with

the ashes and charcoal of its fires. Many heaps are large, some being thirty feet in diameter and three or four feet deep. Scattered through this mass of earth are great numbers of bones of the animals and fish which served as food for the villagers. Mingled with these animal remains are representatives of all the imperishable articles which were in use in the village. Many of these are fragmentary. They were discarded and thrown into the refuse because they had been broken. Many, however, are entire (fig. 58).

Somewhat similar to the refuse heaps are the ash pits, which occur rather frequently upon Iroquoian sites. These are pits about three feet in depth filled with ashes and charcoal. Artifacts are occasionally found in these pits.

A very constant characteristic of the Iroquoian sites of western New York and of that portion at least of Ontario which lies between

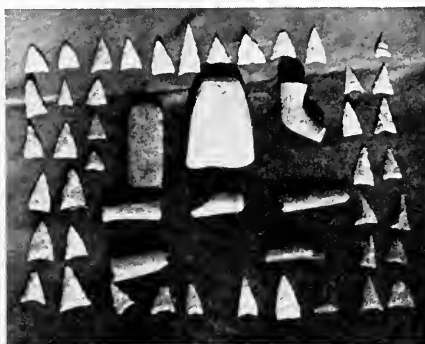


FIG. 59.—Articles from a small site at Conewango where refuse heaps occur, containing animal bones and potsherds. Only triangular points are found.

the Niagara and the Detroit rivers is the small, triangular chert point. This type of point is very abundant and, upon pure Iroquoian sites, it occurs to the entire exclusion of all other types. For instance, from one refuse heap on an Iroquoian site in South Buffalo I took a hundred and fifty of these small, triangular points, but not one of the notched or shouldered type. Of hundreds of points found on an early Seneca site at Richmond Mills, every one is triangular. They even occur in the graves of historic villages, from which I have

taken perhaps fifty, some of which are made of European flint. It is significant that brass arrow points found on historic Iroquoian sites are all triangular.

These triangular chert points are thin, keen-edged points, nearly always well made and frequently beautifully made. They range from a half inch to an inch and a half in length, and are apt to be narrow as compared with their length (fig. 59).

Another constant characteristic of these Iroquoian sites is the abundance of articles made of bone and antler (fig. 60). These are most often found in refuse heaps or ash pits where the conditions

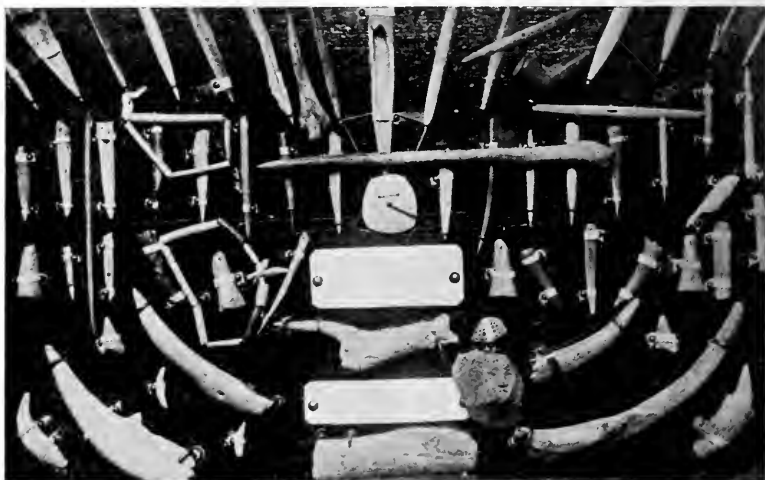


FIG. 60.—These bone articles were found in deep refuse heaps at Clifton Springs and Hopewell. Note harpoons, punches and worked phalangeal bones. Heman I. Coates, collector.

necessary for their preservation seem to have been most favorable, but a few have been found in graves. Bone awls are abundant. Fish hooks, harpoons, and needles are less common but still fairly numerous. Late prehistoric and early historic sites yield many combs marvelously well carved of bone. Cylinders made of bone or antler are fairly numerous. That these were used in making chert points is amply proved by their presence in three complete flaking outfits which I found in graves on Seneca and Neuter sites. Antler

gouges or hoes are occasionally found. Smoothed, flattened, and perforated phalangeal bones of unknown use are numerous.

One of the unmistakable characteristics of an Iroquoian site is the abundance of vessels and pipes made of clay. These occur both in the graves and in the refuse heaps. The refuse contains great numbers of fragments with only an occasional entire specimen, but in the graves are many entire vessels and pipes. Most of these are decorated with a large variety of designs which are constant throughout the territory once inhabited by the Iroquois.

A high situation and evidences of strong defenses are very characteristic of Iroquoian sites, and distinguish them at once from the innumerable sites along the watercourses (fig. 61). These hill-fort villagers seemed not to depend upon streams or lakes either



FIG. 61.—A site near Livonia. It covers the top of a high hill. A bank once followed the edge of the slope. Many bone articles, triangular points and potsherds have been found here. It is early post-European Seneca.

for a water supply, for food, or for travel. They seemed rather to avoid them and to depend for a water supply upon springs, evidently believing that defense rather than a food or water supply was of first importance. Some of these sites crown the highest hills of Allegany, Cattaraugus, and Chautauqua counties, a region of high hills. In the more level country farther north the sites are always to be found upon the highest points. The defenses are indicated now only by earth embankments, the bases of palisades which at one time surrounded the villages (pl. XXIII).

I have already stated that it is my belief that these peculiarities of culture characterize some of the Iroquoian village sites of western New York, and have assumed for convenience that this is true. There is ample proof that these characteristics are constant throughout all the Iroquoian villages of western New York, no matter to what nation they may be ascribed, and not only during the pre-European period but during the early post-European period as well. And every evidence seems to indicate that they are common, also, to other nations of Iroquoian stock beyond the limits of this territory, though in some cases they may be modified somewhat to meet differences in environment.

A careful study of certain sites, well established by history to be the great Seneca villages of the last half of the seventeenth century has shown that in that branch of the Iroquois, even after two generations of contact with Europeans, the peculiarities of culture which I have called distinctively Iroquoian were unmistakable. Even in villages, which existed as late as our Revolution, these same characteristics were evident. The defended, elevated site, whose surface was littered with the black earth of deep refuse heaps, yielded the triangular point of chert, or of trader's brass in the same form, fragments of pottery with the identical decorations of earlier times, beautifully made clay pipes, and even a few articles made of bone and antler, although these had long since given place in general use to those of steel.

In the immediate vicinity of the early historic towns of the Seneca are still earlier village sites. The relationship between these and the later well-known Seneca sites is so close, their remains so similar, that there can be no doubt that these sites were occupied by Seneca villages of an earlier period. The abundant European articles on some, the scanty European articles on others and their absence on still others show that these villages were occupied at a period during which the villagers first came into contact with Europeans. They evidently mark the abode of the Seneca from their latest pre-European period until their earliest post-European period. In all these sites the remains are identical with those of later Seneca sites of historic time, excepting, of course, that the proportion of



THE DITCH AND WALL OF A FORT AT PORTAGEVILLE. INSIDE THE WALL ARE THIN REFUSE HEAPS WITH A FEW POTSHERDS AND TRIANGULAR POINTS

European articles displacing Seneca articles is greater as the villages are later in time. The characteristics of culture which mark the historic villages are common to the earlier sites, and seem constant throughout this transition period of the Seneca branch of the Iroquois.

Stretching south and west from the latest pre-European villages of the Seneca are still other sites, all of the pre-European period. Their relationship to the latest pre-European sites of the Seneca, and the similarity in their remains leaves no doubt that they are sites of Seneca villages of more remote time, marking the entrance of this nation into western New York, in the far remote time when the Seneca Nation split from some older stock and crystallized as a separate nation. Yet the characteristics of the later villages remain constant in these also, leaving no possible doubt that the characteristics noted as Iroquoian have been common to the Seneca branch of the Iroquois, at least, from the remotest time almost to the present.

Do these peculiarities characterize nations of Iroquoian stock other than Seneca? Mr. Parker excavated a great post-European Erie site at Ripley and on it found that the remains coincided in nearly every particular with those of the Seneca. The site was defended by an earth embankment. Its surface was covered with refuse heaps and ash pits in which triangular points and bone articles were abundant. Clay vessels and clay pipes were abundant and were decorated with designs similar in every way to those of the Seneca. A pre-European Erie site at Willoughby, Ohio, which I have examined yields remains identical in all respects. Thus it appears that all the characteristics of the Seneca were common also to the Erie branch of the Iroquois.

Until 1650, well within the historic period, the Niagara frontier was inhabited by the Iroquoian nation of Attiwandarons, the "Neutral Nation" of Samuel Champlain. Several villages which can only be attributed to the Neuter have been thoroughly studied. One of the best known is that on Grand Island which I excavated for the Buffalo Society of Natural Sciences. In general its remains are identical with those of the Seneca and the Erie. Its graves and refuse heaps contained articles of bone and antler. Every point

was of the small, triangular type. Clay vessels and pipes, similar in every way to those of the Erie and Seneca, were numerous. It can safely be said therefore that the Iroquoian characteristics of the Seneca and Erie were shared also by this third branch of the Iroquois.

That these are constant also in the villages of Iroquois not resident in western New York, is apparent in descriptions of the remains on the sites of Huron villages in Canada and the sites of villages of the lower Iroquois in eastern and central New York. In all these will be found the triangular point, the abundant clay vessels and pipes, the abundant articles of bone and antler. Most are defended sites, many are on hill tops, and all are marked by refuse heaps.

In McGill Museum, Montreal, there is shown a collection of articles from the site of the town of Hochelaga. This town was visited in 1534 by Jacques Cartier, who described it and made a list of words used by its inhabitants. This list shows that it was a village of Iroquois people. The articles from this site are all strictly of the Iroquoian type, so much so that pipes from Hochelaga of 1534 might be almost duplicated from collections made in western New York from sites inhabited a century later.

Since sites of well authenticated Iroquoian origin are thus characterized by this type of remains, and since this type is constant over a large area known to have been inhabited by Iroquois of various nations, then it is reasonable to assume that any site in western New York thus characterized is an Iroquoian site, even though no other knowledge exists of its occupants. For instance, there is a defended site at Shelby, Niagara county. From its refuse heaps come triangular points, clay potsherds and pipes, and bone articles. The potsherds bear the usual Iroquoian designs. We have no historical knowledge of the people who once lived there, yet there can be no doubt, judging from these remains, that they belonged to the Iroquoian family.

Going beyond this, we can safely say that even though a site yield articles of this type, and also articles of a totally different type, the site was inhabited at some time by people of the Iroquois

stock. For instance, two sites near Buffalo yield triangular points, abundant pottery and pipes made of clay, and bone articles, yet with these are found numerous notched points (fig. 62). The remains of the Iroquoian type show positively that the sites were once occupied by Iroquois, and, at the same time, or more probably

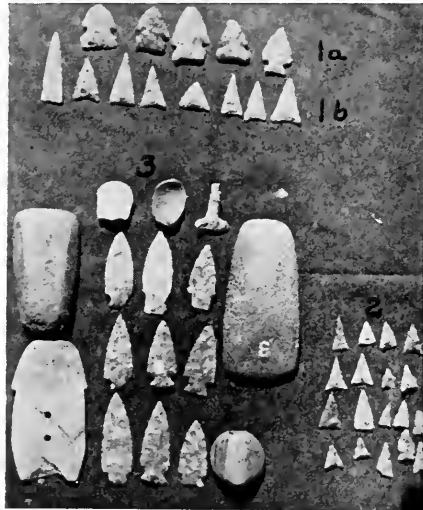


FIG. 62.—Articles from three sites at Conewango. 1a from one end of a knoll, 1b from the other end. (Two occupations). 2 from a site with refuse heaps. (Iroquoian type). 3 from a site with no refuse heaps. Note drill and slate articles. (Non-Iroquoian type).

at a different time, they were the abode of a non-Iroquoian people. This is proved conclusively by the fact that although the two types are found together on the surface, the numerous refuse heaps yield articles of the Iroquoian type only. Again, the site of the historic Seneca village of Honeoye (Anyaye), which was destroyed by an American punitive expedition in 1779, yields articles not only of the Iroquoian type but of an entirely different kind. It might easily be said that both types of articles were in use in this Iroquoian village, but a survey of the site shows that the Iroquoian articles are to be found at one end of the site in refuse heaps, and the non-Iroquoian articles on the surface of the other end. Evidently,

then, this site has been occupied not only during historic times by the Iroquoian nation of Seneca but at some unknown time by an unknown, non-Iroquoian people.

Because remains of this type characterize sites of known Iroquoian origin, and because these remains are constant on certain sites all over Iroquoian territory to the exclusion of all other types, it is reasonable to assume that a site characterized by remains of any other type is not of Iroquoian origin, even though it be in undoubted Iroquoian territory. This is certainly true of western New York (fig. 63). It may be that in other localities the character of Iroquoian remains differs from ours. I can readily understand

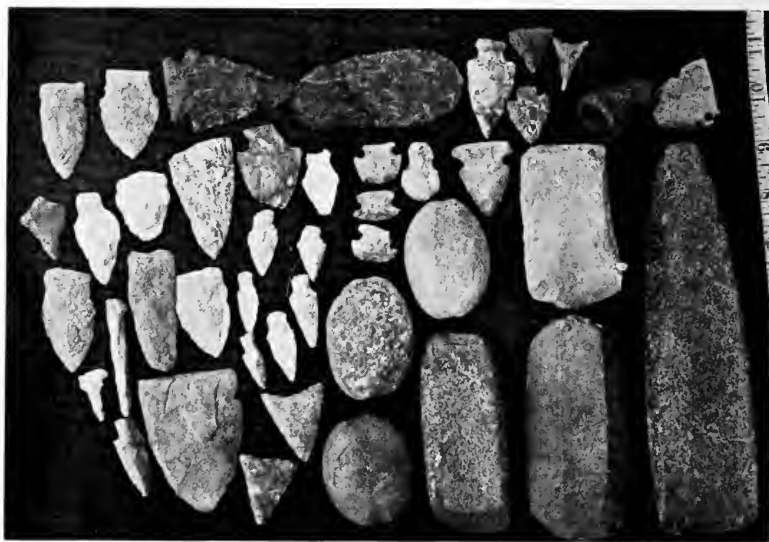


FIG. 63.—Articles from a site at Honeoye Lake, owned by Mr. Auger. Note beveled celts, gouges, notched scrapers and drills. The materials are chert, brown jasper, quartzite and rhyolite (?). These are typically non-Iroquoian, yet note the small triangles and clay pipe marking an Iroquoian camp.

that in territory devoid of chert, as Vermont or Quebec, chert points of the triangular type would be absent, and that if its place were taken by the local quartz, quartzite or slate, these would be better adapted for making the larger, heavier points, with notches for secure hafting. Yet so constant are these characteristics in a

large number of undoubted Iroquoian sites that there can be no doubt that their absence from a site warrants us in ascribing it to some people other than Iroquois.

In classifying sites as to their origin there has been amongst archeologists a tendency to disregard the remains found on them and to ascribe the sites to the nation which inhabited the territory during historic times. Such a tendency is entirely natural. For instance it is an undisputed historic fact that the Seneca inhabited the Genesee valley during historic times, and that there was a large Seneca village near Mt. Morris. On a site at Mt. Morris were two mounds, from which were taken some native copper articles, a necklace of river pearls and a "monitor" pipe. It was natural to assume that these graves were of Seneca origin. Yet the graves and their contents are typical, not of the Seneca of 1779 but of a people who lived in southern Ohio long before European time. Again, the Cattaraugus valley is assumed to have been in territory occupied by the Erie. Then what is more natural than to say that the site at the mouth of the creek is an Erie site, and the notched points found there are typically Erian? Yet as a matter of fact the remains on that site are typically non-Iroquoian, and therefore not Erian. Again, suppose that all the articles found in Ontario county were arranged in a museum, and the collection labeled as having come from that county. It was the seat of the Seneca Nation from the beginning of their history until the end of the eighteenth century, consequently the natural inference is that all the articles in the collection must be of Seneca origin, and that they constitute a typical exhibit of Seneca remains. Yet this collection would include articles from the graves of the great historic Seneca towns, from the refuse heaps of prehistoric Seneca villages, as well as from the innumerable non-Iroquoian sites scattered along its streams and lakes.

Disregarding these unmistakable characteristics of Iroquoian culture has been the cause of at least one serious error. In *Bulletin 140 of the New York State Museum* is an article by Mr. Luther in which he locates the "oldest Seneca village" at the head of Canandaigua Lake. He bases his article upon the facts that a Seneca village existed there and that he had collected Indian

articles in the fields there. Similarly the Department of Ethnology, in its *Handbook of American Indians*, *Bulletin 30* (p. 502) states of the Seneca that "When first known they occupied that part of w. New York between Seneca lake and Geneva (*sic*) r., having their council fire at Tsonontowan, near Naples, in Ontario co." As a matter of fact, the Seneca village was inhabited during Revolutionary times, and the articles which Mr. Luther attributed to this village are pre-European articles of the non-Iroquoian type, and therefore not Senecan.

With the characteristics of Iroquoian sites well established it is possible to use them in classifying sites in territory once inhabited by Iroquois outside of western New York. There is need of this classification in the Susquehanna valley where both Iroquoian Andaste and Algonkian Delaware lived in historic times; in northern Ohio, the historic seat of the Iroquoian Erie and of various non-Iroquoian tribes; in southern Quebec and the Canadian peninsula; and in western Vermont, the "Irocoisia" of Champlain. In all this territory there are innumerable sites, some of which must certainly be ascribed to Iroquoian nations, and exact data are needed regarding these to establish the course of the migration of the Iroquois into New York. There is need also of definite knowledge of the characteristics of non-Iroquoian sites. These must be established through a careful study of sites of undoubted pre-European Algonkian origin, in Canada and Pennsylvania.

BUFFALO, NEW YORK.

THE ZUÑI LA'MANA

By ELSIE CLEWS PARSONS

OF these "men-women" there are today in Zuñi three or, one might almost say, three and a half—there is a boy about six years old qualifying, so to speak, for the status. An elderly Zuñi with whom I talked, a man over seventy, had known during his lifetime of nine *la'mana*. Mrs. Stevenson mentions five.¹ The three adults now living are about the same age, in the late thirties and early forties. Their names are Kasineli, Tsalatitse, and U'k.² Kasineli I watched repeatedly in the audience of a five-day rain dance; Tsalatitse was pointed out to me in the street; U'k I failed to see or rather recognize during my first visit to Zuñi in August, he was taking part in the *ko'kokshi* when I began to look for him, in the last two of the five days' dance, and then I had to leave Zuñi. On my second visit in December, U'k was dancing again, but this time I saw him without a mask. The child, Laspeke (for Las Vegas), I had several opportunities to watch. Far from adequate, my observations may be nevertheless worth recording, so very little has been recorded at all about the Indian berdache. I hope to continue the study.

To begin with the little boy, he is still dressed as a male, wearing trousers and a shirt; but his shirt is of a considerably longer cut than that of the other little boys, nor is it tucked into the trousers as they sometimes tuck in theirs. Around his neck is a bead necklace, a mixture of commercial and of stone beads, an ornament not altogether commonplace for either little boys or girls. His hair-cut is the usual all round short cut for boys—girls of his age would be growing a lock at the back of the neck. His features are unusually fine and delicate, unusual even in a Zuñi girl, and

¹ "The Zuñi Indians," *Twenty-first Annual Report Bureau American Ethnology*, p. 37. Three of them became *la'mana* after 1890.

² U'k "sounds like a man's name," I was told; *ditse* is the ending of a girl's name.

his facial expression unusually gentle, mild of expression as is the Zuñi of either sex. Whenever I saw him playing about he was with a girl, although boys of his age begin to gang together. "He talks like a girl," I was told. And by that I learned was meant that he used the "expressions" of a girl,¹ their exclamations and turns of speech.² A few of these differentiations in the speech of the sexes I collected:

Oh, dear!

Girl: *Hia an'nal* or *An'nal*

Boy: *Cha an'nal*

Oh, lovely or bully!

Girl: *Ho èlul*

Boy: *Cha èlul*

Ouch!

Girl: *Hia atul*

Boy: *Cha kochi'*

Stop!

Girl: *elesmal*

Boy: *Lesmal*

I don't want to! I'm shy!

Girl: *Hia atil*

Boy: *Cha atil*

Oh, I'm so tired!

Girl: *Hish atu ho utechika.*

Boy: *Hish kochi' ho utechika.*

It's awfully cold!

Girl: *Hish itsu' tetse.*

Boy: *Cha itsu' hish tetse.*

Oh, it's very good!

Girl: *Hish ali hekwa alitecha.*

Boy: *Hish ali alitecha.*

Kasineli has the facial expression and the stature of a man. He has the longer stride of a man, but it is slow and ponderous like the Zuñi woman's. During the rain dances he always stood on the roof top behind the old woman who is the head of his house-

¹ The Hopi woman's word of thanks is *eskwali*, the man's *kwa kwi*. (Hough, W., *The Hopi Indians*, p. 115. Cedar Rapids, 1915.)

² Lowie notes that Assiniboiné berdaches "employed the affirmative and imperative particles peculiar to women's speech." (*Anthropological Papers, American Museum of Natural History*, IV, 1, p. 42. New York, 1910.) See too Fletcher, A. C. and La Flesche, F., "The Omaha Tribe," p. 132, Twenty-seventh *Annual Report Bureau of American Ethnology* (1905-6).

hold. He did not wear the American calico petticoat so many of the Zuñi women wear but his dress was in every particular as far as I could see like a woman's, and he wore his black blanket in woman fashion, up around the back of the head, irrespective of the temperature, and falling to the knees.¹ Next him on the roof top were standing or sitting three or four kinswomen. One of them was an informant of mine. To the *la'mana* in her family she would never refer, although we talked of the subject in general from time to time and we worked together on her family genealogy. Nor would she take me to the house where he lived, the house of her father's sister where her own little son was living and where she had grown up. Her people had tried very hard to dissuade the lad from becoming a *la'mana*, I was told,² and I got the impression that in general a family would be somewhat ashamed of having a *la'mana* among its members. In regard to the custom itself there seemed to be no reticence in general and no sense of shame.

Kasineli is a first-class plasterer. So is Tsalatitse—he had been called in to plaster the chimney-place of the room I lived in, by the way. Kasineli is especially good too at pottery. Among the other six *la'mana* my old man informant had known during his lifetime two were noted as skilful weavers of blankets, and two as skilful potters.³

It is the *la'mana*, Mrs. Stevenson states, whose special function it is to fetch from To'wa Yaleně the clay used in making pottery. This is certainly not so today; anyone may fetch the clay. My elderly informant declared it was never the function of the *la'mana*. At two periods during his memory, however, have the Priests of the Bow endeavored to give a sacred character to the pottery-making, confining it to the first four days of the summer solstice

¹ A Zuñi man wears his blanket in summer only when it is chilly and well up over his head and above his knees. In winter it falls lower, leaving his head bare. Indoors as well as out it stays in place around his neck and across his face up to his nose or even eyes. It is a mode of wearing his blanket as irrespective of temperature and as conventional as that of a woman.

² Mrs. Stevenson who seems to have known his family pretty well states that his mother and grandmother were quite complaisant, but that the grandfather, the elder brother Bow priest, tried to shame the boy out of his intent. (*The Zuñi Indians*, p. 38.)

³ One of them was undoubtedly We'wha, a notable character. (See Stevenson, *The Zuñi Indians*, pp. 37, 310-13, 374.)

ceremonial, prescribing the firing for the fourth night. Mrs. Stevenson describes this custom without mentioning, however, that it is an innovation.¹ It is possible, it occurs to me, that limiting the fetching of the clay to the *la'mana* may have been prescribed also by these inventive Bow priests. It is possible, but very doubtful I must say until I hear of other religious or quasi-religious functions attaching distinctively to the *la'mana*. I heard of none.

There are myths, however, in regard to "men-women." In a myth reported by Mrs. Stevenson² it is the *chaakwena*, a god captured by the *kia'nakwe*, who puts on the *kor'koshi* (*ko'kokshi*), a woman's dress to break his spirit—he is rebelling against taking part in a dance to celebrate his capture. This was the first appearance of a male, say the Zuñi, in women's dress. The *kor'koshi* mask in the *kia'nakwe* dramatization is in woman's dress and is called the *ko'thlama* (*ko'lama*).³ Cushing gives a different account of the first appearance of the "man-woman." The first born of the incestuous couple, Siweluhsina and Siweluhsita, the couple who figure so prominently in Zuñi mythology, was "a woman in fullness of contour, but a man in stature and brawn"—a fairly accurate description of the hermaphrodite. And the Zuñi explanation is that

from the mingling of too much seed in one kind, comes the two-fold kind, '*hláhmon*, being man and woman combined—even as from a kernel of corn with two hearts, ripens an ear that is neither one kind nor the other, but both!

According to Cushing then this "man-woman of the Kâ'kâ"⁴ is the elder sister of the *ko'yemshi*, those sacred antic personages of Zuñi ceremonial, sexually abnormal too, we recall, because "seedless."

I was unable to verify these myths. It was positively denied that the *ko'lamana* was the offspring of *awăn tsita* (their mother) as Sewiluhsita is called. He came up with the others (Siweluhsita and Sewiluhsina came up in advance) and he was among those who were lost crossing the river and with them went to *kohuwała* to

¹ *Ib.*, p. 150.

² *Ib.*, p. 37.

³ *Ib.*

⁴ "Zuñi Creation Myths," *Thirteenth Annual Report Bureau American Ethnology*, pp. 401-413.

stay there as a *ko'ko* (god). "He was the first *la'mana*, so there would be others." He figures in the *kia'nakwe* dance because together with other *ko'ko* he was taken prisoner by the *kia'nakwe*.

These myths are, I take it, a *posteriori* explanations of the *la'mana*. They may give a sanction to the transformation custom; they do not originate it. But this matter of possible relationship between the *la'mana* and supernatural function or office needs further study.¹ Meanwhile we should note that the part of the *ko'lamana* appears to be usually taken by a *la'mana*. We'wha took it. Kasineli has taken it. In recent years,² however, it has been played by one who is not a *la'mana*, not a "man-woman," but rather a "woman-man" so to speak. Nancy is called in fact, in a teasing sort of way, "the girl-boy," *katsötsě* (*ka'tsiki*, girl, *ötsě*, male). Of the *katsötsě* I saw quite a little, for she worked by the day in our household. She was an unusually competent worker, "a girl I can always depend on," said her employer. She had a rather lean, spare, build and her gait was comparatively quick and alert. It occurred to me once that she might be a *la'mana*. "If she is," said her employer, "she is not so openly like the others. Besides she's been too much married for one." She was, I concluded, a "strong-minded woman," a Zuñi "new woman," a large part of her male, as Weininger would say.

It is because they like woman's work, is the reason that has

¹ Suggestive in this connection is Jochelson's theory of the "transformed men" of the Chukchee and Koryak. "I think abnormal sexual relations [of five *irka*^e *la'ul* among the 3,000 Kolyma Chukchee, two were "married to other men"] have developed under the influence of the ideas concerning shamanistic power, which the 'metamorphosed' men obtain from the spirits at whose bidding and with whose help the change of sex is accomplished. These beliefs have found fertile soil in individuals of abnormal physical and psychical development." ("The Koryak," pp. 754-5. *Memoirs American Museum Natural History*, vol. VI, pt. II. Leiden and New York, 1908.) See too Parsons, E. C. (Main, John), *Religious Chastity*, pp. 310-1. New York, 1913.

The Franciscan Fathers refer quite incidentally to the Navajo *na'dle* (he changes) men skilled in the arts and industries of both men and women. (*An Ethnologic Dictionary of the Navaho Language*, p. 292. St. Michaels, Arizona, 1915.) Of any supernatural function or trait attaching to these "hermaphrodites" there is no mention.

² The *kia'nakwe* ceremonial is quadrennial. It was last performed in November, 1915. On November 17 the *kia'nakwe* prepared their plumes, on November 18 they came in from the south and danced in front of their *kiwitsine*, the *chu'pawa*, where they spent the night. November 19 they danced until the following sunrise.

always been given me both in Zuñi and among the Rio Grande pueblos for the existence of the "man-woman." At Zuñi I was also told, one of my informants being the woman interpreter I have already referred to, that if the household were short on women workers a boy would be more readily allowed to become a *la'mana*. It is always insisted upon that there is never any compulsion upon him to become one.

Of the nine *la'mana* known to my aged interpreter, two had married men, *i. e.*, lived with men as their wives. One of these *la'mana* had been known to my younger Zuñi acquaintances. He was described as effeminate looking—"pretty," like a woman. The families of both parties were said to have objected to the "marriage." The "marriage" was discussed with me as an economic arrangement, and with not the slightest hint of physical acts of perversion on the part of either "husband" or "wife." It seemed to me at the time that the utter obliviousness to that point of view was due to ignorance or innocence, not to reticence.¹ On questions of sexual intercourse the Zuñi, I would say, is naturalistic, not reticent. Nevertheless it is not at all unlikely that this oblivious manner was assumed to check further discussions—for reasons I do not know.

Although the *la'mana* U'k was, I gathered on my first visit, somewhat effeminate looking, he was not married. (Here I should say that Tsalatitse is not effeminate looking. Like Kasineli he is tall and walks with a long, heavy stride.) U'k was teased, I was told, by the children, and he would answer them back like a child. He walks too more like a child than either an adult man or an adult woman, "flighty like," with short, nervous steps. In short he is an undeveloped kind of person. A careful and reliable woman described him as a simpleton.

¹ It is a pity Mrs. Stevenson felt called upon to be so reticent. "There is a side to the lives of these men which must remain untold" is all she vouchsafes. (*The Zuñi Indians*, p. 38.) The *la'mana* who was married to a man she mentions, but she refers to the couple merely "as two of the hardest workers in the Pueblo and among the most prosperous." Stating that the *la'mana* never marry women and seldom, it is understood, have any sexual relations with them, she reports that We'wha was reputed to be the father of several children, his paternity in one case at least being undoubted.

He is, nevertheless, one of the dancers, for he was initiated into the *ko'tikili*,¹ as are all *la'mana*, just like other boys.² The night I saw U'k dancing during the *sha'lako* ceremonial he was in the *chaakwena* dance, that is with the set of dancers from the *uptsana kiwitsine*.³ He was clothed in the ordinary woman's dress and buckskin leggings plus the usual Hopi dance blanket. He had a downy white feather in his hair, otherwise his hair was dressed in the regular woman's style, bang and turned up queue. He came in to the house fourth in the line of dancers but soon fell out of line and danced separately, opposite the line. Representing a female personage, as I was told he did—that is the position he would naturally take. Before the dancers withdrew, he took a place in the line again, number six. His dance step was much less vigorous than the others; but that is true too of normal males personating "goddesses." U'k is not as tall as the other *la'mana*, his stature is

¹ The initiation takes place between seven and eleven, the age falling necessarily uncertainly because the ceremonial takes place quadrennially. At any rate this age is prior to that when female dress is definitely assumed, about twelve. Nevertheless, judging from the youngster now qualifying as a *la'mana*, a boy is marked down for one year sooner, and he is initiated into the *ko'tikili* in the knowledge that he is to become a *la'mana*.

² Girls are not initiated as a regular thing into the *ko'tikili*. There are only four women in it now—a married woman with children, two older widows, a much married but now husbandless woman, the *katsôtsē* I have already referred to.

Two reasons for not initiating girls as well as boys were given me at different times by my old man informant. Girls would not talk as boys would of what they saw. So there was no need to initiate them to keep their mouths shut. So much for his offhand bit of rationalism. When I pressed him for his tradition he related that in the first days women were taken into the *ko'tikili*. These were the days when the *ko'ko* themselves came and went between the Pueblo and *ko'tuwala*. The women among the *ko'ko* fell in love with them and unwilling to be left behind accompanied them to *ko'tuwala*. Lonesome there, they wanted to be brought back to the *ashiwi*. Such flightiness was too much for the *ko'ko* and so the women were no longer admitted into the *ko'tikili*.

The reason for taking women into the *ko'tikili* is to me still obscure. In her earliest publication on Zuñi Mrs. Stevenson states that the female initiates have to take a vow of celibacy for life and that as a woman member grows old she chooses her successor. In her later publication Mrs. Stevenson omits these statements. I have been told that if a girl were frightened by a bad dream she might be initiated, or, if sick, she might choose to go into the *ko'tikili* instead of one of the fraternities. (Cf. *The Zuñi Indians*, p. 65.) If not initiated under these circumstances, she would die.

³ To that *kiwitsine* he therefore belongs.

more that of a woman than a man. His features, however, are masculine. Their expression in this dance was that of animal-like dumb patience.

When U'k fell out of line the audience, an audience mostly of women with their children, girls, and a few old men, grinned and even chuckled, a very infrequent display of amusement during these *sha'lako* dances.¹ "Did you notice them laughing at her?" my Cherokee hostess asked me on my return. "She is a great joke to the people—not because she is a *la'mana*, but because she is half-witted."

Neither U'k nor the other two *la'mana* are members of any of the esoteric fraternities. Of the other *la'mana* my aged informant had known one, and one only belonged to a fraternity, the Bed-bug fraternity.

When prepared for burial the corpse of a *la'mana* is dressed in the usual woman's outfit, with one exception, under the woman's skirt a pair of trousers are put on.² "And on which side of the graveyard will he be buried?"³ I asked, with eagerness of heart if not of voice, for here at last was a test of the sex status of the *la'mana*. "On the south side, the men's side, of course. *Kwash lu⁴ ōtsě tea'mě* (Is this man not)?" And my old friend smiled the peculiarly gentle smile he reserved for my particularly unintelligent questions.

NEW YORK CITY.

¹ Aside from the merriment produced by the *ko'yemshi*, the only other show of amusement I saw was called forth by the little boys in the *hemishi'kwe* dance, boys who had their faces painted white and wore a *pilone* to represent female figures.

² Noted too by Mrs. Stevenson, *The Zuñi Indians*, pp. 312-3.

³ In the center of the graveyard, one of the few Spanish relics in Zuñi, stands a large wooden cross. It forms the boundary line for this mortuary division of the sexes. "Why do you make the division?" I asked my old man informant. "Because we do not pray to the women for rain, only to the men."

⁴ Personal pronouns showing sex are lacking in Zuñi.

THE SPEECH OF A ZUÑI CHILD

By A. L. KROEBER

FROM June 23 to August 10, 1916, I had occasion to hear the daily speech of Robert Lewis, youngest son of the Governor of Zuñi, then in the twenty-third and twenty-fourth months of his life. His mother, Mrs. Margaret A. Lewis, is an educated Cherokee mixed-blood, and some English is spoken in the house. But seventeen years of residence have thoroughly familiarized Mrs. Lewis with the Zuñi idiom, which is the language of the household. Conditions are therefore substantially normal in this home as regards the acquisition of Indian speech, while a somewhat unusual degree of contact with Americans has obliterated the barrier of shyness behind which the Indian child is wont to take refuge for a long time in the presence of whites. As very little information is extant concerning infant speech among American Indians, the following notes seem to be worth putting on record.

On July 1, Robert's vocabulary consisted of these words:

ma'ma, mother. This is English. The Zuñi word is *tsitta*.

ta'ta, father, for *tattcu*.¹

na'na, grandfather; also any old man. For *nanna*.

wa'wa, paternal grandmother; also applied to other old women. Zuñi *wowwo*. About July 15, Robert began to say *wo'wo* with nearly pure Zuñi quality of the *o*. He uttered the word whenever he wished to be taken to his grandmother's house on a visit; and the desire awoke almost every forenoon. The Zuñi word for maternal grandmother is *hotta*; but Robert's *hotta* and her family being in Oklahoma, he did not know the word. Most Zuñi children, being born and brought up in their mother's and mother's mother's house, would probably learn *hotta* before *wowwo*.

¹ *C* is *sh*, *tc* is *ch*, *l* is surd *l*, ' is the glottal stop. Other characters are self-explanatory, except that the vowels have the continental values and are throughout open in quality, and that all stopped consonants when before a vowel are unaspirated and voiced during an instant of their production. Thus *pa* is "between" English *pa* and *ba*.

pa'pa, older brother, for *paḥpa*.

La' or *Lai*, older sister, for *kyawwu*. The sound was not quite that of affricative surd *L*, but the articulation was so indefinite that no more exact designation is possible. This is the only word in which even an approach to *L* was perceptible. On August 1, Robert listened with interest when told to say *eLLa*, "no," but did not attempt to reproduce the word. Evidently the *L* sound as such was beyond his powers. About July 15 he began to say *kya'* or *kyai* for *kyawwu*.

mle'mle, or *mele'mele* or *mle'mla* (*a* as in English "bad"), American. The Zuñi word is *mellik*, at which I believe *mle'mle* to be an attempt. Robert's mother considers *mle'mle* to be an imitation of the strange speech of the Americans.

ma'ma, bread; also food in general, or eat. The Zuñi word for bread is *mullo*. I could hear no constant difference between *ma'ma*, bread, and *ma'ma*, mother; but the first vowel of the former may have been shorter.

ti'ti, almost *di'di*, meat. For *ci'we*.

tu'tu, drink; also water. Zuñi *tuttu*, to drink.

a'ta, anything sharp, hot, pungent, or strong. I am not sure what the utterance represents. I first heard Robert use it of a knife he held: knife in Zuñi is *attcianne*. It may be that a word like *attu*, a woman's exclamation of sudden pain or heat, was intended.

we'we, dog, for *wa'tsita*.

mau, cat. The Zuñi word is *musa* (pussy).

o'ho'ho or *o'ho*, also heard as *u'hu'hu*, *u'hu*, *hwo'hwo*, and *o'hwo'hwo*, horse or donkey. This is from the English interjection "whoa," which the Zuñi use in handling their animals.

e, yes, as in Zuñi.

no', the English "no," was frequently used by Robert, especially toward the end of our acquaintance, but chiefly as an indiscriminate and automatic answer to any remark made to him in English. He certainly connected the syllable with English speech; but it seemed to hold no further meaning. I did not note that he expressed denial or unwillingness other than by struggles or crying.

na' was one of his earliest utterances, his mother tells me, spoken on a variety of occasions. The syllable seems never to have crystallized into a definite meaning, for during my stay he employed it quite randomly. I believe that it is not an imitation of any Zuñi word, but that it represents an early attempt at articulation which formed into a habit.

ai' was an expression indicative of pain or inconvenience. I can not account for its origin. There is a frequent Zuñi interjection *hai*; but it means rather "is that so?" and its intonation is quite different from Robert's *ai'*.

Including the last three exclamations, this record shows a total of eighteen different words spontaneously uttered by this boy during the first week of our acquaintance. I am omitting all words spoken by him merely in response to suggestion or request. I estimate that he may have possessed in his vocabulary at this period two or three other words that I did not happen to hear: but his mother could recollect no others. The maximum reckoning is therefore about twenty vocables; the strictest count yields fifteen or sixteen.

It is interesting that of this number, six words, or one third of the total, are terms of consanguinity. At that, the fact of his mother being an immigrant deprived this youngster of two relatives that the average Zuñi child has in his home: the *hotta* or mother's mother, already mentioned, and the *kyakkyä* or mother's brother. On the other hand, he used no word for man, woman, boy, or girl. Men were *pa'pa*, older brother, or sometimes *ta'ta*, father; boys, *pa'pa*; old men, *na'na*, grandfather. The recognition of age seemed quite remarkably accurate. Possibly our children in their second year perceive age equally well; but certainly our speech habits do not equally encourage expression of the fact.

The horse, dog, and cat in the vocabulary have their parallel in every Caucasian home; and the type of interest in the animals appeared to be the same.

The one verb, *tu'tu*, drink, is interesting. I am under the impression that the Zuñi mention water less frequently than we in connection with the act or desire of drinking. Moreover, their

word for drink is much easier for a child to form than their word for water, *ky'awe*, in which the initial sound is both glottalized and heavily palatalized.

Robert's command of sounds at this period included all five of the vowels of Zuñi, formed fairly clearly; the stops *p* and *t*; the nasals *m* and *n*; voiced *l*; a badly articulated surd *L* as a substitute for *ky*; *w*; *h*; and the glottal stop. The latter concluded every or nearly every syllable. Zuñi sounds that were not yet formed were the palatal stops *k*, *ky*, and *kw*; the affricatives *ts* and *tc*; the fricatives *s* and *c*; surd *L* as a definite sound; and the series of glottalized sounds *kw'*, *k'*, *ky'*, *ts'*. So far as they occur, these are precisely the sounds with which English speaking children have difficulty. Vowel quantity was little regarded, if at all; and there was no trace of the consonant lengthening which is so conspicuous a feature of Zuñi. The accent was invariably on the first syllable, as in our children's talk; but this is also a standard trait of adult Zuñi speech. The unvoicing of unaccented and especially of final syllables in which every Zuñi habitually indulges had as yet not made its appearance in Robert's talk.

Between July 1 and August 10, a number of changes and additions were observed.

About July 8, *te'* was frequently uttered with a pointing gesture. There is no corresponding Zuñi word and I suspect that it represents English "there."

July 12, he said *po'* for *poklinne*, smoke or tobacco. This was on the occasion of his first sentence heard by me: *mle'mle po'*, the American is smoking. Utterances of three consecutive words were reported to me, but I heard none of more than two during the remainder of my stay.

July 13, he began saying *po'po* for *po'yanne*, hat, in my hearing. He is said to have first uttered this word several days previously.

About July 15, the first palatal stop was heard, in *kya'* instead of *la'* for *kyawwu*, older sister.

On July 18, Robert enjoyed himself calling the same syllable *kya'* to the horses, obviously in imitation of his father's "giddap."

July 22 and on several following days he frequently repeated

opata, apparently for the pleasure of the utterance and without clearly associated meaning. It seemed to be English "over there." More interesting is the fact that this vocable had three syllables of different sound; and that the final *a* was often whispered or unvoiced as in typical adult Zuñi speech.

July 26 he called a gun *to'*. The Zuñi word is *towo'ananna*. The reduplicating tendency was evidently no longer as strong as a month before.

About this period he adopted a characteristic Zuñi intonation. In calling, or in forcible address, the Zuñi frequently lengthen the final syllable, change it from slurred *a* or *e* to *ai*, shift the accent from the initial syllable to it, and end with a sharp rise in pitch. Robert acquired this habit almost perfectly within a day or two, and soon went about calling *ma'ma'i*, *pa'pa'i*, *ta'ta'i*, instead of *ma''ma*, *pa''pa*, *ta''ta*.

Within a week, he had added *e'le'* or *e'le'i*, the vocative form of *e'lactokya*, girl, by which term his older sister, in consonance with Zuñi custom, was habitually addressed in the household. Robert's imitation of his mother's familiar call was perfect to its very inflections.

About August 7, he similarly called *Tci'pa'i*, his oldest brother's name. The stimulus of this utterance seemed to be the pleasure of its finished production, rather than want of his brother. He never used the quieter, non-vocative form *Tci''pai'u*.

This word contains the affricative *tc*, nearly like our English *ch*. I did not hear this difficult sound in any other word. On August 9, Robert was still saying *to'to* for *tcotco*. This is a Zuñi "children's word" for clothes, and was undoubtedly taught him at his grandmother's house.

From the same source he derived, about August 1, another standard Zuñi children's word: *lu'lu*, American. By August 10, he was using this about as frequently as his own equivalent *mle'mle*.

On August 7, he watched me removing splinters of glass from the ground. The bright bits caught his eye; and when I stopped, he pointed to one after another neglected fragment until I had tossed them too away, saying each time: *topa*, which is Zuñi for

"one" or "another one." The repeated enunciation was remarkably correct: the chopping apart of the syllables by the glottal stop was almost imperceptible.

During the six weeks ending August 10, or shortly before the second anniversary of his birth, this Zuñi boy then had increased the range of his vocabulary by half or more. He had learned to articulate a forward palatal stop and an alveolar affricative. He had not yet pronounced the fricatives *s* or *ç*, surd *L*, nor any glottalized consonant; nor did he respond to invitations to imitate these sounds. He had, however, mastered a characteristic tonal inflection, was beginning to unvoice according to rule, and was drifting away from his early leaning to make every word consist of two identical but separate syllables. Of grammatical structure there was as yet no trace, and sentence building remained sporadic and of the most elementary kind.

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ANIMAL FIGURES ON PREHISTORIC POTTERY FROM MIMBRES VALLEY, NEW MEXICO¹

By J. WALTER FEWKES

IN a previous account² of pictures on aboriginal pottery from the vicinity of Deming, New Mexico, attention was called to the wealth of realistically drawn animal figures, and to the importance of the pictures of human beings in a study of aboriginal dress, implements, and ceremonial customs. From time to time since that publication (1914) I have received from the discoverer of these objects, Mr. E. D. Osborn of Deming, New Mexico, additional photographs of pictures on mortuary bowls, some of which have been reproduced in an account of my work published in annual reports on the explorations of the Smithsonian Institution for 1915 and 1916.

Among the recent acquisitions from that region are several pictures of such an unusual character that I have prepared the following brief account of them, like the preceding, preliminary to a final discussion in which the pictures made by the aborigines of this valley will be treated more in detail.

From an artistic point of view the pictures considered in the following pages are fully equal to those already published. It is not too much to say that in technique and beauty of decoration the Mimbres pottery is inferior to none from ancient pueblos.

REPRESENTATIONS OF HUMAN BEINGS

While the ancient Mimbres potters painted many human figures on their pottery, I have seen no instances of these where the heads are human and the bodies animal, or vice versa, although certain objects worn on the heads of one or two specimens resemble heads

¹ Published by permission of the Secretary of the Smithsonian Institution.

² Archeology of the Lower Mimbres Valley, New Mexico. *Smithsonian Miscellaneous Collections*, vol. 63, no. 10.

of animals, imparting to the whole a resemblance to the Hopi masked beings called Kachinas.

Some of the human figures that occur in the pictures lately acquired are here described. One represents a hunter carrying in one hand, which is raised, a curved object resembling a Hopi boomerang or rabbit stick. He faces a well-drawn jack rabbit, readily distinguished by long pointed ears and short turned-up



FIG. 64.—Seated figure with crooked stick and triangular meal packet.



FIG. 65.—Man standing under a fish.

tail. In addition to a rabbit there is another animal like a dog represented in this picture. We know that the ancient pueblos domesticated the dog, which legends declare aided his master in hunting, and in fights with bands of enemies. Several figures representing men holding sticks terminating in crooks occur in the new collection of Mimbres pictures, duplicating in this respect those already published. One of these crooks (fig. 64) has a triangular figure attached midway in its length, recalling the corn meal packet found attached to the Hopi prayer-stick elsewhere¹ described.

One of the most instructive Mimbres pictures (fig. 65) represents a masked dancer standing under a fish. He wears a cap, with a visor which resembles a duck's bill. This cap also has an eye

¹ *Op. cit.* p. 29.

drawn on one side suggesting a bird's head. The man carries on his extended right arm a rod to which feathers are attached.

The markings on the head and thighs of another man (fig. 66) are characteristic, and suggest bodily decorations. The dancer (fig. 67) wears a Phrygian cap, the apex of which, turned sidewise, terminates in a triangular design. The ancient Mimbrenos ordinarily wore nothing comparable with these objects on their heads,



FIG. 66.—Seated human figures.



FIG. 67.—Dance figure with a Phrygian cap.

and when we find them, we may conclude they are war-bonnets, or ceremonial helmets, which, among the Hopi, are woven with feathers on top. A design on the forehead of this figure recalls the Hopi symbol of a corn ear which occurs in the same position in personations of the corn maids. A picture of a woman, shown in plate 1, fig. 1 of my *Archaeology of the Lower Mimbres Valley* (*op. cit.*, p. 25) which has a similar "band" or checkerboard decoration drawn across her forehead, is referred to as follows:

Across the forehead are alternating black and white square figures arranged in two series, recalling corn [maize] or raincloud symbols. On the head of the Horned Serpent (*op. cit.* p. 44, fig. 28) is found a double row of rectangles each with a central dot.

When likened to an ear of corn each of these dots would represent a kernel.

A remarkable ceremonial headdress is shown in the next figure, fig. 68, from a bowl owned by Mr. Pryor, and found in a ruin near the N A N ranch in the Upper Mimbres. This headdress reminds one of those depicted in the Aztec codices and on Mexican pottery. Two human beings are represented in this figure, one seated on the other who is prostrate, with severed head. The seated figure wears a helmet with projecting snout and a median horn extending forward, recalling the head of the Horned Serpent. The eye is represented on the side of the headdress which is extended downward between the shoulders and along the back where it is decorated with chevrons separated by parallel lines. In one hand, which is raised, the seated figure holds aloft a curved object like a weapon, possibly a stone knife, while the other hand grasps what appears to be the hair of his victim. The prostrate and decapitated figure requires no extended description. The head is severed from the body which is crossed by parallel bands, and connected with it by a few zigzag lines, which might represent flowing blood or unsevered tissues.

The remarkable likeness of this picture to some of those in Mexican codices is suggestive. An exact identification of the figure wearing the helmet mask is not possible, but the single horn on top of the head calls to mind a similar appendage universally depicted on the head of the Horned Serpent; the form of the mouth has a remote likeness to that of the Mexican Rain god, Tlaloc. Whether the seated figure represents a supernatural being or simply a warrior who has slain an enemy, does not appear from the evidence at hand, but the headdress is certainly suggestive of the former.

The upper part of the heads, except the hair, of several human figures in Mimbres pottery is not painted, while cheeks, chin, lips, and all the lower part of the face is blackened. The eye is indicated by a circular or ovate figure bordered with lines on each side and a dot in the middle. When the upper half of the head is painted black, the eye is indicated by a white lenticular figure with a black dot in the middle.

In the Pryor collection there is another bowl, on the interior of which is represented a hunting scene. We have here two men in

the act of dragging a quadruped by ropes attached near the neck of the animal. One of the men grasps the stick in both hands to which the rope is attached. The animal appears to be holding back so strongly that the hunter's arms are stretched behind his back. The action suggests an animal captured by a lasso, and resisting his captors.

COMPOSITE ANIMAL FIGURES

Among the most unusual of all the animal figures on Mimbres pottery are those made up of two or more animals of different genera or even different zoological groups united into one anomalous form.



FIG. 68.—Seated figure with serpent headdress (Pryor Collection).

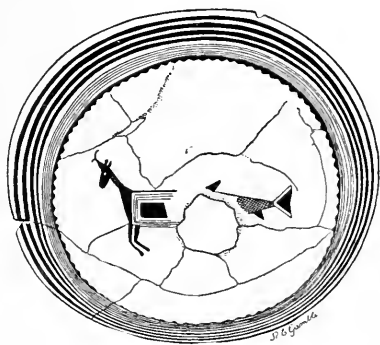


FIG. 69.—Composite animal; head, body, and anterior legs of quadruped, tail of fish.

Students of classical mythology are familiar with those fabulous beings, half human and half animal in form, which the ancients were accustomed to figure. Pictures or other representations of Cecrops, for instance, depict him with a human head and snake body. There are several forms of sphinxes, one of which has a lion's body to which is united the head of a ram, another with the head of a hawk, and another that of a human being. Chimera has the body of a lion, from the back of which arises the head and body of a goat, while the tail terminates in the head of a dragon. Centaurs have bodies of horses, surmounted by human heads and bodies.

This union of two animals, or a man and an animal, is very

rarely mentioned in North American myths. Prehistoric representations of such compounds are almost unknown; the few pictures from Mimbres mortuary pottery are of exceptional interest on account of their rarity.

In a former publication I have referred to these composite animals as "problematical animals," although recognizing their double body form. Thus, in one of these, fig. 69, the anterior portion of the body has the head and limbs of a horned quadruped, while the posterior portion has the body and tail of a fish, in which dorsal, caudal and anal fins appear. My conclusions regarding the identity of one form of this animal were as follows:

Its head and mouth are not those of any of the horned animals already considered, although it has some anatomical features recalling a mountain sheep. The extension back of the body has a remote likeness to a fish, but may be a bird or simply a conventional design.

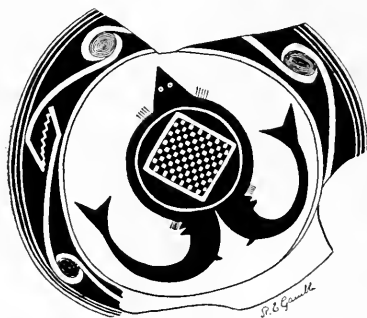


FIG. 70.—Composite animal; head and body of turtle, double tail of fish.

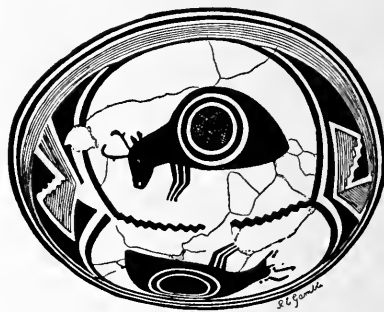


FIG. 71.—Composite animal; head of horned quadruped, legs and body of insect.

In a note on the same page (p. 40 *op. cit.*), I was inclined to regard the posterior of the animal as a "geometric design of unknown significance," but the presence of a fish's tail attached to a horned animal shows a composite or double animal.

In figure 70 we have a picture of an animal supposed to be a turtle showing a checkerboard figure¹ on the back, in which the

¹ The geometric figures on the bodies of figures 69, 70, 71, are seldom found on the bodies of animals figured on Pueblo pottery, although sometimes at their sides. It has been suggested that these, like the so-called "tectiform" figures on paintings of buffalo in French caves, may refer to shrines, or dwellings of the animal depicted.

tail is double, suggesting two fishes. It sometimes happens in prehistoric art that the two halves of the body of an animal are flattened out and represented separately as if the animal were split open. This may be an explanation of the biped fish on the posterior end of the turtle, but if so it is a unique instance of this bifurcation in Mimbres pictography.

The anterior extremity of the body of another figure (fig. 71) represented in *Explorations and Field Work of the Smithsonian Institution for 1915* has horns, ears, and markings on the throat like those of an antelope, but the body and legs of an insect.

Prehistoric pueblo drawings on pottery never represent two animals united in one figure in the same way as those from the Mimbres, as may be seen from a comparative study of those areas where life figures predominate. There is no area in the Southwest where we have as large a proportion of life forms depicted on prehistoric pottery as in the Hopi and Little Colorado regions. Collections of pottery from the ruin Sikyatki in the former show a comparatively larger percentage of figures of animals and human beings than those from any other pueblo area, but no examples of two animals united are known from this ruin. Representations of animals are abundant and highly conventionalized in pottery collections from Homolobi, a ruin on the Little Colorado, but none of these are composite,—two animals of different genera united in one figure. Many figures, as that of the Plumed or Horned Snakes have organs of one animal combined with those of another; as the body and head of a serpent with feathers of a bird, and there are examples of twin animals united but no illustrations of two or more different genera of animals joined. The same conditions occur in the decorations of Keresan ceramics, which are also rich in life figures. Animal forms are found, but no indications of a union of two animals. In the pottery of Pajarito, and that of other culture areas from which numerically large collections have been made, there are life figures, but these pictures are practically modifications of a few animal types, none of these designs showing double animal forms. The same is true of the archaic forms of pottery decoration from the San Juan culture area, one of the richest in geometric

designs, but poorest in pictures of animals. It can not be compared in variety with the highly specialized richly decorated earthenware of the Mimbres, Little Colorado, or Hopi (Sikyatki).

ANIMAL PICTURES

The prescribed circuit is regarded among primitive people as a matter of great moment in ceremonial work. In a sacred room, among the Hopi, one should never approach or leave the altar without regard to a fixed law. It is taboo to turn in ceremonial dances in any but one direction, which is likewise prescribed for a line of dancers when marching around a plaza or court. Cardinal points should be mentioned in a definite sequence, which must also be observed in speaking of colors representing those points, or in

using colored sands in the production of sand paintings. Figures drawn on ceremonial objects when represented as moving around a center must face in the prescribed direction. Many other instances might be mentioned, and it may be said that the direction varies, being with, or opposite to, the course of the sun, in different tribes. Among the Hopi the sequence is always opposite to the course of the sun, that is with the center on

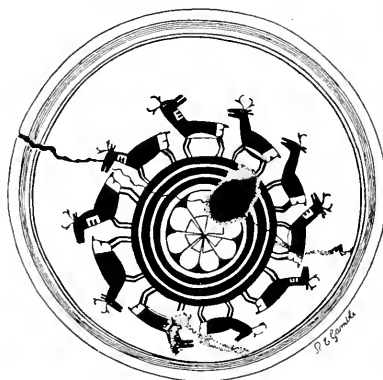


FIG. 72.—Nine antelopes illustrating movement in sinistral circuit.

the left hand or what is called the sinistral circuit.

The beautiful food bowl shown in figure 72 is instructive, and shows the probable ceremonial circuit used by the prehistoric Mimbres people. The animals are represented as moving in the sinistral circuit as with the Hopi. It will be noticed that all these animals are represented with heads in the same direction and that opposite to the movement of the hands of a watch, the center around which they appear to move being to the left.

The several new forms of birds occurring in the Mimbres

ceramic material bring the number of genera up to something less than twenty, a relative average about equal to that on all pueblo pottery of birds and other animals. Some of these winged animals resemble butterflies but the majority are so well made that the bird forms cannot be mistaken for insects.

GEOMETRICAL DESIGNS

Although the life figures found on Mimbres pottery are the most striking, they are not more important from an ethnological point of view than the geometrical designs. In all respects they are characteristic and unlike any that occur elsewhere in the Southwest. A brief reference to one of these forms which possesses special interest is given below. I have not found in Mimbres pottery as large a proportion of stepped figures, ordinarily called "raincloud designs" on true pueblo pottery, nor is the black and white ware on which these figures occur represented, a significant fact in regard to the chronology of the ancient people.

Rough coiled, incised or indented ware is found, and one or two effigy jars¹ remind me of Gila Valley and Casas Grandes ware, especially the latter.

Every new specimen of figured food bowl discovered in the Mimbres, enlarges our knowledge of the culture of the prehistoric aborigines of this valley, as well as increases our admiration for the artistic skill of the prehistoric potters of that valley, especially their ability in

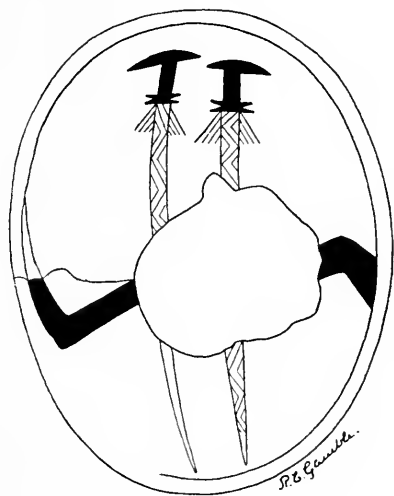


FIG. 73.—Sword-like objects of unknown meaning.

drawing human and animal figures. The geometric designs they bear are wholly different from those of any area of the pueblo region. The fidelity with which the prehistoric potters of the

¹ I have seen effigy jars as far north as the San Juan but very sparingly represented.

Mimbres depicted animals, and the great variety of forms they represented, often so truthfully as to enable us to identify them, is one of the marked features of pottery from this region.

Two sword-like objects are depicted on the bowl shown in figure 73, but it is not known what these objects are. From the fact that what looks like parts of an arm are also shown, it has been suggested, that these two objects are figures of staffs or batons, ceremonial in nature, possibly badges of office. The general form shown in the picture is that of a handle like a sword with hilt, and a blade crossed by parallel lines forming chevron figures



FIG. 74.—Quadruped grasping an unidentified object.

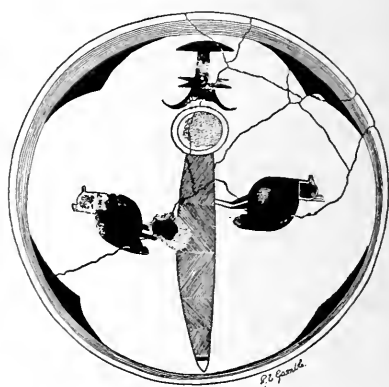


FIG. 75.—Sword-like object on which are two birds.

which are repeated several times in their length. On another bowl (fig. 74) we find a picture of a quadruped which seems to grasp an object of similar nature to the last mentioned. But by far the closest figure to the sword-like implements above represented is one here shown (fig. 75) which has the hilt-like extremity, a circular enlargement at one end and two birds apparently walking on the shaft.

I have said little of the colors of Mimbres pottery because I attach a secondary importance to it in a study of prehistoric culture relationship. The main thing is the symbolic or realistic design. Long burial in the earth sometimes changes the color especially of black and white ware, colored with manganese and iron oxides.

When submitted to intense heat this ware often gets back the pink color it had before burial. Classification of pottery by shades of color should be used with great caution.

This ceramic material confirms me in the opinion already expressed that in prehistoric times there had developed in the region through which the Mimbres flows a type of culture quite unlike that of any pueblo area, and allied to that of the Casas Grandes valley of which it is the northern extension. Here we have a highly differentiated type of pottery decoration connecting the pueblo culture on the north with that of Casas Grandes on the south, although there appears to be no similarity in the architecture of the two regions.

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INDIAN TRAP PITS ALONG THE MISSOURI

By A. HRDLIČKA

DURING the writer's recent visit to the Cheyenne River Sioux Reservation, South Dakota, he observed in passing over the low hills along the Missouri, numbers of circular depressions in the prairie-like surface of the slopes, the significance of which for a time was very puzzling. The depressions are, as a rule, circular, shallow, of moderate size (the hollow averaging perhaps less than five feet) and surrounded by somewhat elevated unbroken rims. They are scattered irregularly over the surface, and are quite numerous in certain localities. The first impression was that they might be the sites of lodges, but there were no signs of occupation in the way of potsherds or other refuse such as is generally found about even temporary habitations. Larger depressions of like nature, which are plainly enough the remains of habitations, exist in other localities along the Missouri, as, on a low island belonging to the Agency. Another thought was that they might indicate caved-in burials.

Accompanied by Mr. Fred. C. Campbell, Superintendent of the Cheyenne River Indian Agency, and several of his employees, the writer excavated and carefully examined a number of the depressions found on the slopes about a mile from the Agency; but found nothing that would give a clue as to the purpose of the pits. An employee of the Agency interested in archeological collecting, who had previously dug into some of the depressions, told us that in a few instances he found in them, well beneath the surface, what appeared to be rafters of cedar. Stunted cedars occur in neighboring ravines. He led us to one such pit, where by digging, we found some nearly decayed pieces of cedar rafters; but even this threw no light on the purpose of the depressions. It was suggested that they might be the remains of roasting pits in which the Indians "barbecued" deer or parts of the buffalo, which in view of similar

practices by widely scattered American tribes, did not seem unreasonable.

Shortly after the writer left for the Fort Yates Reservation in North Dakota, and in looking for burials he came across similar depressions on the gentle slopes in the neighborhood of the "Farm School," not far from the Missouri. Inquiries as to their purpose were made among the Indians, with interesting results. A Sioux declared, without hesitation, that the depressions were the remains of excavations made by members of his tribe up to relatively recent times for the purpose of catching hawks and eagles, whose feathers were in great demand. As the country is barren of trees, there was no chance of shooting the birds with a bow and arrow, and little even with a gun. So they made excavations in the ground which would accommodate a man and covered them with stout sticks. Then a man would crawl in and a jack-rabbit, alive or fixed as if alive, was tied to the rafters, or in front of them. An eagle or a hawk, upon espying the rabbit, and not seeing the man in the dark hole beneath, would pounce upon the former, whereupon the Indian would quickly seize the bird by the feet, pull it under the rafters into the dark, and wring its neck.

This accounts for all the conditions met with in connection with these depressions; the trap itself being a good illustration of the inventiveness of the Indian.

On the writer's return, in narrating the above experience to Prof. Holmes, the latter pointed to a somewhat similar contrivance in use by the Tulare Indians of California.¹ In this case the birds sought were pigeons, and instead of holes in the ground, which would be difficult or impossible to make on the rocky sites, the Indians made surface shelters with small platforms in front on which the bait was placed.

U. S. NATIONAL MUSEUM,
WASHINGTON, D. C.

¹ Holmes, Win. H., "Anthropological Studies in California," *Report U. S. National Museum for 1900*, Washington, 1902, pp. 155 et seq., pl. 32.

A PREHISTORIC ANTHROPOMORPHIC FIGURE FROM THE RIO GRANDE BASIN

By L. L. W. WILSON

IN Richard Hakluyt's version of Espejo's *Relación* there are three allusions to the idols of the Pueblo Indians.

In this province our men found many idols which they worshipped, and particularly they had in every house an oratory for the diuell, whereinto they ordinarily carry him meat. . . .¹

Which Indians have and doe worship idols. . . .²

Of the Queres, he writes:

Who worship idols as their neighbors do,
and in conclusion he says:

We may boldly presume that they will easily embrace the Gospel and abandon such idolatry as now most of them doe live in.³

It is interesting to compare with the Hakluyt version, the exact translation from the *Narrative of Espejo* given to us by Professor Bolton:

In each one of these pueblos, they have a house to which they carry food for the devil, and they have small stone idols which they worship. Just as the Spanish have crosses along the roads, they have between the pueblos in the middle of the road, small caves or grottoes, like shrines, built of stones, where they place painted sticks and feathers, saying the devil goes there to rest and speak with them.⁴

Of the Maguas:

and like the rest, have idols which they worship.⁵

Of the Queres:

They are idolators.⁶

¹ *Voyages of the English Nation to America, Collected by Richard Hakluyt, Preacher*, vol. III, p. 107.

² *Op. cit.*, p. 109.

³ *Op. cit.*, p. 115.

⁴ *Explorations in the Southwest*, H. E. Bolton, p. 178.

⁵ *Op. cit.*, p. 180.

⁶ *Op. cit.*, p. 181.



CLAY IMAGE WITH TURQUOISE EYES AND HEART, FOUND AT OTOWI, NEW MEXICO. PRO-
FILE VIEW OF CLAY IMAGE SHOWING THAT THE FEATURES WERE LEFT IN RELIEF

Of the Jemez:

They have idols . . . as the provinces heretofore mentioned.¹

Moreover, Oñate in *Discovery of the Salines and the Sea* writes:

In all of these pueblos we found crosses which the Indians reverence and to which they are accustomed to make the same offerings as to their idols. . . .²

And yet comparatively few such figures have been found. Ex-Governor L. Bradford Prince has the largest single collection of stone idols; there are some in the Archeological Museum at Santa Fe and in other museums. Too often the pedigree of these figures is unknown or obscure. Nelson, however, reports the excavation of two room-idols of stone, one in Pueblo Blanco and the other in Pueblo Largo. He found, also, a shrine-idol on a hillock about six hundred feet from Pueblo Largo.³

The small clay figure (pl. XXIV) excavated August, 1916, from one of the rooms of the large pueblo at Otowi⁴ is unique, so far as I know. It is cylindrical, five and a half inches high, and one and three quarters inches in diameter. It is black with soot, yet everywhere underneath this black covering may be seen the light red coloring which was superimposed upon the gray clay.

As the profile view shows quite clearly, the arms, neck, face, and features were produced first by incision and then by rubbing away contiguous areas.

Turquoise is inset in the middle of each of the eyes, and in the chest. The latter ornamentation corresponds in position to the mark on the stone idol described by Nelson.⁵ Does it represent perhaps the heart?

The figure was found in the circular hole apparently made for it in the north wall of the room, ten inches above the floor, and one foot and eight inches from the northeast corner (pl. XXV). The room itself measured nine feet nine inches, six feet seven inches (the great-

¹ *Op. cit.*, p. 182.

² *Op. cit.*, p. 235.

³ Pueblo Ruins of the Galisteo Basin, N. C. Nelson, *Anthropological Papers, American Museum of Natural History*, vol. XV (1914), pp. 71, 91, 102.

⁴ Otowi is a large pueblo on the Jemez Plateau included in the Bandelier National Monument. It is being excavated under my direction for the Philadelphia Commercial Museum.

⁵ *Op. cit.*, p. 71.

est length from east to west) with an average height of four feet four inches. The height signifies little. Undoubtedly the rooms in this pueblo were originally about six feet high, for they decrease in height quite regularly toward the plazas. This room is the fourth from the great central plaza, and the third from a smaller plaza between it and another arm of the same building.

The west wall of the same room had an opening (closed with stone) into the next room, eight inches long and a foot in height, and on its southern wall two doors, one two feet nine inches by one foot five inches, and the other one foot nine inches by one foot four inches



FIG. 76.—Room in which the image was found, showing the southern doorways and the western opening described in the text.

(fig. 76). These doors were closed with stone and cemented, but this work was done from the room to the south, and not from the room with the clay image.

The southern room communicated with a room still farther south by means of eight circular openings of the same character



ROOM IN WHICH THE IMAGE WAS FOUND. THE IMAGE IS IN POSITION IN THE CIRCULAR HOLE TEN INCHES ABOVE THE FLOOR

ROOM SOUTH OF THE "IDOL" ROOM, SHOWING EIGHT HOLES SIMILAR TO THOSE WHICH HELD THE CLAY IMAGE. ALL OF THESE HOLES WERE EMPTY EXCEPT ONE, AND THAT WAS CLOSED WITH STONE AND ADOBE

as the one containing the clay figure, but all of these holes were empty except one. That had been closed with a stone and then plastered over.

Whether this figure was an idol or a "diuell," I am naturally unable to state, but its composition, ornamentation, and the situation in which it was found make it intrinsically interesting.

COMMERCIAL MUSEUM,
PHILADELPHIA, PA.

IN MEMORIAM

By W. H. HOLMES

MATILDA COXE STEVENSON

MRS. Matilda Coxé Stevenson was born in San Augustine, Texas, and in infancy removed with her parents, Alexander H. and Maria Matilda (Coxé) Evans, to Washington, D. C. She was educated at Miss Anable's school in Philadelphia, and on April 18, 1872, married James Stevenson of the U. S. Geological Survey of the Territories. For a number of years, beginning with 1879, Mrs. Stevenson accompanied and assisted her husband on various exploring and collecting expeditions in Arizona and New Mexico, and in this way acquired so full a knowledge of the town-building tribes of the arid region and of the requirements of research among them, that in 1889 she was assigned by the Bureau of Ethnology of the Smithsonian Institution to ethnological work among these people, in conjunction with Mr. Stevenson who on the separation of ethnological researches from the Geological Survey had become a member of the latter organization.

During her several prolonged visits to Zuñi Mrs. Stevenson gained the complete confidence of the people; was regarded and treated as one of themselves and commonly addressed as "mother." Her researches were largely among the women of the tribe and directed toward an understanding of the domestic life and practices—a field from which men are largely excluded, for among the Zuñi the women have exclusive control of the rites and observances which pertain to their sex. The work of Mrs. Stevenson was thus complementary to that of Mr. Stevenson, Mr. Cushing, and other students of this people, and served to round out our knowledge of tribal history in directions hitherto imperfectly understood. Her studies of child life were especially important. She divided her voluminous work in this field into two parts; first, that dealing with the practical or domestic side embracing the habits and customs,



MATILDA COXE STEVENSON

games, and other ordinary activities of the children; and, second, the religious instruction and observances connected with childhood. The immediate result of the researches relating to the latter topic was the completion of a paper entitled "Religious Life of the Zuñi Child" which appeared in the *Fifth Annual Report of the Bureau of Ethnology*. This paper is introduced by a brief account of the mythology of the Zuñi, with special reference to its bearing on the life of the child. Her work is properly regarded as a distinct contribution to this important branch of ethnological research.

In 1881, Mrs. Stevenson's labors were extended to the Hopi villages and to some of the ancient ruins of Arizona and New Mexico, to the collecting of prehistoric earthenware, and to other branches of the interesting and varied material arts of the tribes.

After Mr. Stevenson's death in 1888, Mrs. Stevenson undertook the arduous task of arranging and digesting the voluminous notes of her husband relative to the tribes, and of studying the extensive collections which he had made. Naturally these data were in many respects incomplete and the illustrative material insufficient for an extended treatment of the subject. It was found advisable therefore to have her continue the field work, a task for which she was now well fitted. The work was carried forward with indefatigable energy and zeal, and new fields of research were one after another opened to her. The seasons of 1890-91 were spent with the Sia, and the results of her studies were published in the *Eleventh Annual Report of the Bureau of Ethnology*. In this paper every phase of the life of this small but interesting tribe is discussed—their history, arts and industries, social organization, cosmogony, cult societies, music, songs, childbirth and mortuary customs, and especially the elaborate ceremonies connected with theurgic rites and the bringing of rain.

In 1891 Mrs. Stevenson resumed her investigations among the Zuñi Indians and devoted the better part of her time until 1895 to the further study of this most interesting people. Having already gained the full confidence of the Zuñi she succeeded in obtaining admission to a number of secret organizations and ceremonies usually forbidden to outsiders, and especially to women. It was

her aim to record in full detail a complete knowledge of this people, a work in which she had a rare degree of success. The task as a whole, however, is one quite beyond the possibility of accomplishment within a single lifetime. Her researches concerning the religious beliefs and activities of the Zuñi people were exceptionally thorough, and her great work, published in the *Twenty-third Annual Report of the Bureau of Ethnology*, is a monument to her energy, ability, and perseverance. Mrs. Stevenson concludes this work in these modest words:

The writer has made several prolonged visits to Zuñi, and after many years of investigation and intimate acquaintance with the priests, theurgists, and the people generally, feels sufficiently acquainted with them, their life, and their thoughts, to venture a presentation of their esoteric beliefs, their rituals, habits, and customs. The limitations of this volume, however, make it necessary to give only a restricted account of many subjects that are deserving of more extended treatment, and much material has been reserved for future publication.

While the writer has gone deeply into the subject of the religion of the Zuñi, and is able to record the more important details of their philosophy, there are yet many fields to be worked, and an attempt at drawing final conclusions will not be made until more extensive studies of allied tribes have been undertaken. If that which is here presented serves as a basis for future investigation, and aids the Government to a better understanding of the North American Indians, the author will have succeeded in her purpose.

In January, 1904, she set out for New Mexico with the view of continuing her researches in certain directions, especially with respect to the relation of the Zuñi people in various culture fields to other tribes of the general region. Chief attention was given to the mythology and to the ceremonial observances which follow in quick succession during the late winter and the early spring months. She found the people of Zuñi much changed in recent years: the former gentleness of character and the marked courtesy of the primitive aborigines had largely disappeared, except with a few of the older men and women, the desire of sordid gain engendered by contact with the whites outweighing other consideration.

Mrs. Stevenson was commissioned in 1903 to collect material illustrative of her researches in Zuñi, to form part of the Bureau's exhibit at the Louisiana Purchase Exposition, the special topic

being the religious symbolism embodied in the various arts, such as pottery, textiles, basketry, costume, and ceremonial objects generally. Her study of this subject, one heretofore much neglected, was thorough, and the significance of nearly every symbol now used by the Zuñi was obtained. She observed that, while the officers of the secret fraternities have full understanding of the symbolism associated directly with their ceremonial arts, few persons knew the meaning of the designs employed in the decoration of pottery and the other useful arts, the artists themselves having little appreciation of the poetic imagery associated with the various devices. Mrs. Stevenson expressed fear that the original significance of the decorative motives of the Zuñi people must soon be lost by them.

Aside from her systematic researches a number of special subjects were investigated, including the irrigation system of the Zuñi, the manufacture and use of native dyes, and the preparation of pigments. In January, 1905, she again entered the field, having selected the pueblo of Taos, New Mexico, as a suitable place for continuing her researches. In initiating her work in this pueblo she encountered many difficulties and her progress at first was slow; but later her study of the history, language, and customs of the tribe was facilitated and excellent results were obtained.

For a number of years Mrs. Stevenson continued her researches among the Tewa villages of the Rio Grande. Her knowledge of the tribes had now become so mature that comparative studies could be taken up to advantage, and visits were made to various pueblos for the purpose of comparing the arts and industries, mythology, ceremonies, etc., of the people. This work was continued until failing health made it advisable to return to Washington, where her varied, interesting, and most useful career came to an end June 24, 1915.

Mrs. Stevenson was one of the founders and a permanent member of the Women's Anthropological Society of Washington. Among her writings is a paper read before this Society, March 8, 1888, entitled "Zuñi Religion." It appeared in *Science*, vol. XI, no. 268, March 23, 1888. The closing paragraph of this address

is of much interest to the student of primitive beliefs and practices.

The brief account which has been given of the medicine orders of the Zuñi is perhaps sufficient to convey an understanding of this interesting phase of the pueblo life of North America. The dignitary who is usually called the "medicine-man" among our Indian tribes, is something more than the term implies in civilization. The medicine-man is both priest and doctor, and, by reason of his priestly office, he sometimes becomes a judge. The mythical beings with whom he holds converse are the gods of his people. They are the persons who bring evils, or preserve from evils: they bring health or disease, they bring peace or war, and they bring plenty or want at harvest time. Thus in all respects the gods are supposed to hold within their power all prosperity and all adversity. So the priests stand between the people and these gods, and by means of ceremonies, incantations, and many prescribed observances, the gods are induced to preserve from evil and bring happiness. The medicine practices of the Zuñi are therefore religious observances and rites; and the daily life of the Zuñi, under the guidance of their priests through the agency of the medicine order, is so controlled that every act of life assumes something of a religious character. To them their religion is fraught with much fear; to them it brings many trials, many privations, and much suffering. Notwithstanding this, they derive from it much amusement and great joy, and in it all their hopes and aspirations are centered.

Owing to the intimate relations which Mrs. Stevenson had acquired with the Pueblo tribes, she was able to penetrate deeply into customs held most sacred by the tribal authorities, and the following lines, quoted from *Smithsonian Collections*, vol. 63, disclose the startling fact that human sacrifice has been practiced even in recent years among some of the Pueblos.

Zoöic worship has to do with the healing of the sick, the beast gods acting as mediators between man and the anthropic gods. The most shocking ceremony associated with the zoöic worship of the Tewa is the propitiation of the rattlesnake with human sacrifice to prevent further destruction from the venomous bites of the reptile. The greatest secrecy is observed and the ceremonies are performed without the knowledge of the people except those directly associated with the rite which is performed quadrennially. Although many legends of the various pueblos have pointed indirectly to human sacrifice in the past, it was a revelation to Mrs. Stevenson when she found that this rite was observed by the Tewa at the present time; and, while it is known to exist only in two of the villages, she has every reason to believe that they are not exceptions. In one village the subject is the youngest female infant. In the other village an adult woman is sacrificed, a woman without husband or children being selected whenever possible. The sacrificial ceremonies occur in the kiva. The subjects are drugged with *Datura meteloides* until life is supposed to be extinct. At the proper time the

body is placed upon a sand painting on the floor before the table altar and the ceremony proceeds amid incantations and the most weird performances.

Additional details are too gruesome to be related in this place. The informant, however, took great risk in divulging a secret so strictly kept and dangerous to the tribal authorities even to one so intimate with the inner life of the tribe as was the subject of this memoir.

Mrs. Stevenson was able, self-reliant, and fearless, generous, helpful, and self-sacrificing, and the writer of these lines is deeply indebted to her and to Mr. Stevenson for heroic service in his behalf in a time of great need. While exploring in the Jemez mountains he was prostrated by spinal weakness due to reckless mountain climbing, being unable either to ride or walk. During two days required to summon a physician from a distant point the invalid was under Mrs. Stevenson's efficient care. Meantime, the inventive genius of the party undertook to solve the problem of his transportation to a place of safety. Under the supervision of Mr. Stevenson two long slender saplings were cut, placed side by side about two feet apart, and across the middle a litter was built on which the invalid was placed. A docile mule was harnessed between the heavy ends of the poles, travois fashion, the slender ends resting on the ground and serving as runners. In this manner, guarded by the Stevensons and followed by the entire expedition, which included Major Powell, Secretary Langley, and others, the unique procession descended over the rough mountain trails to the first settlement, whence after several days of recuperation in the home of Dr. and Mrs. Voorhees of Jemez village, the writer was able to reach the railroad and return to the East.

JAMES STEVENSON

The opening up of the great West was a task of no mean magnitude and enlisted the energies of a multitude of venturesome and fearless men and women. The hunter, the miner, and the homesteader were ever to the fore, penetrating the wilds and blazing the trails for the hosts which were to follow. One vast region, the Rocky Mountains, succumbed to these encroachments with much

delay, however, and the work of the pioneers was supplemented by that of the scientific explorer and more especially by the great surveys of the national government. Early in the field among these organizations was the Hayden Survey of the Territories, and associated intimately with the leader of this great enterprise and his ever stanch helper and fellow worker was James Stevenson, who may appropriately receive commendatory mention in this place. Members of the Survey had the privilege of spending the winter months in Washington preparing maps and reports on the previous season's work, and in 1872 Mr. Stevenson met and married Miss Evans, who, as already related, became his associate in the work of exploration.

James Stevenson was born in Maysville, Kentucky, December 24, 1840, and died in New York City July 20, 1888. When the Civil War broke out he joined the Northern army and served to the close of hostilities. He then engaged in explorations in the Northwest in connection with the engineering corps of the government, and afterwards with the United States Geological Survey of the Territories under Dr. F. V. Hayden, of which he became the executive officer. With Doctor Hayden he followed the Missouri, Columbia, and Snake rivers to their sources, and was an ever faithful and efficient aid in the conduct of the expeditions. He took an active part in the survey of the Yellowstone region and was instrumental in having the heart of this "wonderland" made a national park. He was continued as executive officer of the Survey when it passed under the directorship of Maj. John W. Powell, but was soon detailed for research in connection with the Bureau of Ethnology of the Smithsonian Institution, exploring the ancient ruins of Arizona and New Mexico, investigating the habits and customs of the Navajo, Zuñi, Hopi, and other tribes, and making extensive collections of interesting art materials of the regions, ancient and modern.

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THE LIST OF MRS. STEVENSON'S SCIENTIFIC PUBLICATIONS IS AS FOLLOWS:

1. Zuñi and the Zuñians. Privately published, Washington, April 18, 1881, pp. 1-30.

2. The Religious Life of the Zuñi Child. Fifth Annual Report Bureau of Ethnology, 1883-84 (Washington, 1887), pp. 533-555, 4 plates.
3. Zuñi Religion. *Science*, vol. XI, no. 268, New York, March 23, 1888.
4. Tusayan Legends of the Snake and Flute People. *Proceedings American Association Advancement of Science*, vol. XLI, 1893, pp. 258-270.
5. The Sia. Eleventh Annual Report Bureau of Ethnology, 1889-90 (Washington, 1894), pp. 3-157.
6. A Chapter in Zuñi Mythology. *Memoirs of the International Congress of Anthropology*, Chicago, 1894, pp. 312-319.
7. Zuñi Ancestral Gods and Masks. *American Anthropologist*, vol. 11, Feb., 1898, pp. 33-40.
8. Zuñi Games. *American Anthropologist* (N. S.), vol. 5, no. 3, July-Sept., 1903, pp. 468-497.
9. The Zuñi Indians: Their Mythology, Esoteric Fraternities, and Ceremonies. Twenty-third Annual Report Bureau American Ethnology, 1908-09 (Washington, 1904), pp. 1-608, pls. 1-129, figs. 1-34.
10. Ethnobotany of the Zuñi Indians. Thirtieth Annual Report Bureau American Ethnology, 1908-09 (Washington, 1915), pp. 31-102.
11. The Sun and Ice People among the Tewa Indians of New Mexico. (Abstract.) *Smithsonian Miscellaneous Collections*, vol. 65, no. 6, pp. 73-78, 1914-1915.
12. Strange Rites of the Tewa Indians. (Abstract.) *Smithsonian Miscellaneous Collections*, vol. 63, no. 8, pp. 73-80.

BOOK REVIEWS

METHODS AND PRINCIPLES

The Mythology of All Races. Vol. I: *Greek and Roman.* WILLIAM SHERWOOD FOX. Marshall Jones Co., Boston, 1916. Pp. lxii, 354.

The above is the first of a series of volumes prepared under the general editorship of Dr. L. H. Gray. The title sufficiently explains the scope of the series. It is insisted on both by the consulting editor, Professor George Foot Moore, of Harvard, and by Dr. Gray, that the undertaking is unique in that the result is to be neither a cyclopedia nor a group of technical monographs, but something that combines the advantages of both. It may perhaps be doubted whether even the fullest and widest discussion of mythology will tell us completely (p. xiii) "what the childhood of our race has thought of the mysteries of nature and of life, and how it has endeavoured to resolve them." But of the value of Dr. Gray's plan there can scarcely be any doubt.

The volume on Greek and Roman mythology is written by Professor Fox of Princeton. The author divides his treatment into three parts. In the first he deals with the Greek myths, partly according to geographical distribution, and partly according to subject; Herakles, Theseus, the Argo, Troy. In the second part, he treats of the Greek Gods individually. Part III is called "Mythology of Ancient Italy," although Etruscan mythology is dealt with rather cavalierly. An appendix contains brief reviews of Lawson's *Modern Greek Folklore* and Leland's *Etrusco-Roman Remains*.

The book is attractively and clearly printed on excellent and substantial paper,—a prodigality for which we should be grateful. There are further no less than sixty-three plates, many of them colored, and most of them clear and interesting. Probably the only print that may be called unsuccessful is that of the Roman *as*, with the head of Janus (pl. LXI, 2). Many of the illustrations are reproductions of less-known monuments, such as an Aphrodite from Toronto (pl. I) or the little statuette of Zeus in the Metropolitan Museum (pl. xxxviii). In externals, the volume is admirable and attractive.

There, unfortunately, commendation must, in all candor, cease. With every desire to speak well of an undertaking like the present, and every wish to do justice to the difficulties of Dr. Fox's task, it cannot

be said that he has been successful either in exposition or interpretation.

In his Introduction (pp. xli-lxii) the author attempts an analysis and general characterization of myth-making among the Greeks. To many of his statements, exception would probably be taken by most investigators of the subject, but it must be remembered that most of the topics are matters upon which there can scarcely be general agreement. Yet, that a myth was "accepted as true by its original maker and his hearers" (p. xliii), is altogether too doubtful to deserve the emphasis it receives, and the "unique character" which Professor Fox finds in the fact that Greek myths cover a great variety of themes (p. xlix) will be seriously questioned by students of other mythologies. There is no adequate discussion of the importance of individual poetic fancy, and the ethical inferences (pp. liv-lv) are somewhat naïve.

However, it would be no serious objection to a book that the author's opinions are different from those of the reviewer or even from those usually held, and in general questions we cannot get beyond opinions. But it is in the body of the book that Professor Fox lays himself open to criticism of the most serious kind.

The book is intended both for the general reader who wishes to know what the ancient stories were, and for the more advanced student who may desire to pass from it to the pages of Farnell, Harrison, Gruppe, Fowler, and Wissowa. For that reason, an accurate presentation of the well-known forms of the legends—however grouped—might have been expected to be followed by a more thorough discussion of their variants and their interpretation. Professor Fox seems to have absorbed some of the variants into the story, to have suppressed some details, and very fully told others, and nowhere is any principle of presentation apparent. The result is a nondescript thing which is neither any one of the well-known forms of the legend, nor yet a complete collection of all its variants, nor, again, the hypothetical kernel around which the variants gathered. He has done this with the story of Oedipus (p. 49), and with Meleager (p. 57).

But it might at least be demanded that the details he mentions be correct. The omissions of certain *motifs*, such as the touching of the earth in the story of Antaeus (p. 87), may be intentional, but why is it said that Atlas was "beguiled" into the theft of the apples (p. 88) or that Niobe was changed to stone for punishment (p. 175) or that the famous choice of Herakles was between Aphrodite and Athena (p. 76)? However, these details are small matters and may be treated as venial lapses, and they are completely eclipsed by the many gross blunders that occur later.

For these gross blunders there is all the less excuse, because the author is professor at a university that has finely refused to follow the lead of other colleges in substituting pomology and soil-chemistry for the humanities as the basis of education. When, accordingly, we read that the "story of the courtship and wedded life of Admetos is the theme of the *Alkestis* of Euripides" (p. 107) we can only gasp, as when the point in the story of the *Symplegades* (p. 111) is wholly missed. But what, shall be said of the fact that on pages 127-130, Professor Fox gives a synopsis of the *Iliad* and that this synopsis is seriously and generally incorrect! We read, for example, that after the dream sent by Zeus, Agamemnon marshals his army, but at the sight of the Trojan preparation, "weakens in his purpose like a craven (*sic!*) and is forced to change his will by Odysseus." That is only one misstatement among others quite as egregious with which the succeeding pages are dotted. But whereas these blunders are consistent with the supposition that the author had once read the *Iliad* but had forgotten it, his astounding summary of the *Aeneid* (p. 306) almost precludes the supposition that he has ever read at all Books VII-XII of that not insignificant classical monument.

When Dr. Fox takes up the gods separately, the same phenomena occur,—incorrect statements or reckless overstatements. So Zeus is said (p. 154) to have devised means for breaking the truce between the Trojans and Achaians—which he did not do. Kronos "dies" on p. 155 is defiance of his immortality, henotheism is wrongly defined on p. 157, and on p. 158 Zeus is specially distinguished from other gods by acts that can be paralleled in the stories about most of them. And after twelve pages of specifying the functions of Zeus, one of the most important and fruitful of them—that of Zeus Xenios, is quite omitted.

One of the most surprising characteristics of the book is its treatment of etymologies. The derivation of the name Athena from *a-thenion*, "without mother's milk," is declared (p. 169) to be worth consideration. The name of Ares is connected—apparently with approval—with *ara*, "a curse" (p. 189), Althaia is the "Nourishing Earth," p. 219. On page 197, we are told of Aphrodite's name that the "first half is surely connected with the Greek *aphros* 'foam,' but as to the meaning of the second we must admit ignorance."

Even in discussing the illustrations, the author displays an inexcusable carelessness. In plate VIII, a kylix signed by Aristophanes is placed in the "early" fifth century (*cf.* pl. XXVI) the Farnese Bull (pl. XV) is called a Greco-Roman work, the sculptor Myron (pl. XL) is placed in the latter half of the fifth century.

The style is slipshod, falling not infrequently into direct solecisms, e. g., "whom she felt could not be" (p. 71), "the hellhound with three heads and out of whose body" (p. 88), "unburdening his heart to Thetis, she brought him a set of armour" (p. 129).

It will hardly be expected that this book should be seriously compared with many of the works so abundantly cited in the Bibliography. The latter, it may be said in passing, despite its extensiveness, shows some important omissions, such as Bethe's *Thebanische Heldenlieder* and Wilamowitz' *Herakles*, and has the usual fault of such lists that tenuous articles are placed side by side with epoch-making treatises. For the general reader, Guerber's *Myths* or Bullfinch's *Age of Fable* will be more reliable sources of mythologic information than Dr. Fox's book, and the more advanced student will be better orientated by Steuding's tiny manual in the Goeschen collection.

One thing deserves special notice. Misprints are almost non-existent—a fact that is eloquent testimony to the thoroughness of the proof-reading. If the substance of the volume had been revised with anything like this painful accuracy, the important series planned by Dr. Gray would have had a more auspicious beginning.

MAX RADIN

The Mythology of All Races. Vol. x: North American. HARTLEY BURR ALEXANDER, Ph.D., Professor of Philosophy, University of Nebraska. Marshall Jones Co., Boston, 1916. Pp. xiv, 325, 1 map, 2 figs., 33 pls.

The author of this book has achieved an impressive *tour de force* in self-restraint: he has written a volume on North American mythology without treatment of theoretical problems. When we consider that he is not an ethnological field worker but a professor of philosophy, his self-abnegation is seen to transcend what had been deemed, humanly speaking, possible.

Viewed as a purely descriptive work, evidently limited in scope by editorial or other preconceptions as to the nature of mythology, the volume before us deserves very high praise. With astonishing industry Professor Alexander has examined, abstracted, and cited not only the obvious authorities, but also the relatively recondite or at all events little-used sources of information sprinkled through journals and the older traveler and missionary literature. Both the layman and the scholar versed in the mythologies of better-known areas will thus find a very useful guide in this book as to the range of mythological conceptions characteristic of our North American aborigines.

ROBERT H. LOWIE

NORTH AMERICA

A Pre-Lenape Site in New Jersey. E. W. HAWKES and RALPH LINTON
(Anthropological Publications, University Museum, University of
Pennsylvania, Vol. VI, No. 3, Philadelphia, 1916, pp. 43-77, Plates
XVI-XXIV.)

Catchword errors have at least the virtue of rendering class characteristics conspicuous. Such an error in the work under review serves then to point out that the "argillite culture" at Trenton cannot be used as a class caption to designate a dumping-ground for heterogeneous data.

The essential characteristics of the "argillite culture" of Abbott and Volk can be determined by an analysis of Volk's published data¹ to be the following. The culture as a whole is manifestly distinct from that of the Lenape, since artifact forms are confined to pitless hammerstones and to a limited number of types of arrow points and larger chipped blades. These objects are not exclusively of argillite, and all are more or less weathered. In addition fire-fractured stones, some charcoal (?), and fragments of bone were found. Tabulating Volk's extensive series of measurements of individual objects of the "argillite culture" found in the yellow soil, the startlingly unique character of the finds is brought out. Throughout the area of his digging, some three miles long, the objects lay in a single plane of maximum deposition and at every point in that plane showed a vertical distribution identical with that of a normally variable series; this in spite of the fact that Volk refers to "fire places" and "workshops" in the yellow soil.² It is true that nowhere is Volk explicit as to the significant characteristics of his "argillite culture," but his data have been published in great detail.

Subsequent excavations in the yellow soil by the American Museum of Natural History³ corroborated these characteristics and demonstrated further that the distribution of pebbles in this stratum—clearly of non-human deposition—was identical with that of the artifacts. This seems a fair indication that the depositing agent at Trenton was geological and not human.

In their excavations at a site on Rancocas Creek, six miles from the Delaware River and fifteen south of Trenton, Messrs. Hawkes and Linton found two or three distinct cultures corresponding to two geological strata. In the surface soil were remains of the Lenape, while at the

¹ Ernest Volk, "The Archaeology of the Delaware Valley," *Papers Peabody Museum American Archeology and Ethnology*, Cambridge, August 1911, vol. V.

² *Ibid.*, pp. 85, 87, 88, 89, and 98.

³ *American Anthropologist*, vol. 18, no. 2, April-June, 1916, pp. 181-197.

bottom of a stratum of yellow soil below this argillite implements were found lying on white glacial sand. In an intermediate position in the yellow soil were "a few scattered points of argillite exhibiting better workmanship and less signs of decay" and sherds of very crude pottery. In the lowest stratum fire pits had been dug down into the white glacial sand and

while the white sand was discolored for some distance down, the yellow layer above was unmarked, proving conclusively that they had no connection with the upper layer.

Lying on the white sand and arranged in parallel rows about a large central fire pit were groups of objects—banner stones, large blades and concretions. These objects were "characterized by crude workmanship and an exclusive use of argillite," as well as extensive decay of the surface. Six types of points were recognized here, lances, hand daggers (?), knives, diamond-shaped points, broad-faced barbed points, and fish spears (?); with these were many banner stones and other objects, some problematical.

The artifacts from an intermediate position in the yellow soil were "characterized also by the use of argillite, but with improved workmanship and the beginnings of pottery." All of the types found in the lowest level, except the lance and broad-faced barbed point, and in addition one drill, were found in this intermediate level. With these were several potsherds of unique composition.

So much for the cultural characteristics. According to Prof. Amos P. Brown, who determined the geological characteristics of the site, there are indications that the yellow sand is a wind-borne deposit laid down upon the layer of white glacial sand, and though its age is not clearly defined, it must be of considerable antiquity.

Why then has the material from the lowest and the intermediate layers been classed with the "argillite culture" of Trenton? It would appear that the authors have established this identity on the basis of the following characteristics supposed to be common to both: the exclusive use of argillite in each case, the extensive decay of the surface of the artifacts, the proximity of the sites, and the occurrence of objects in both cases in a stratum of yellow soil. The foregoing brief résumés should at once make it clear that we have to do here with a gross error in identification. Even a casual inspection of Volk's data, *not* his general statements, would show that argillite was not exclusively used at Trenton. The decay to which the surface of artifacts at both Rancocas Creek and Trenton has been subjected is hardly to be considered presumptive evidence in favor of their identity. The proximity of the sites may be

considered as additional evidence only if the identity of the cultures is established on other non-topographic grounds, but certainly it is of little significance when the disparity of the material is obvious. Finally, the off-hand assumed equivalence of the yellow soil strata in the two sites is inadmissible as evidence of the identity of the cultures. We are told in one case that "there are indications that the yellow sand is a wind-borne deposit laid down upon the layer of white glacial sand," while the geological antecedents of the Trenton deposit have never been determined! Further, the difference in the way in which the equated cultures occur in these strata is entirely ignored. In one case, the objects were apparently deposited by human agency on a temporary surface which was subsequently covered by yellow soil, while in the other the artifacts occur in a curious accidental fashion, and moreover appear to be but part of a larger general series comprised of artifacts and pebbles together.

But above all the obvious cultural dissimilarity of the two groups is ignored, or rather not considered of sufficient weight to militate against the identification of the cultures. Yet both of the Rancocas Creek culture horizons are richer in traits than is the Trenton "argillite culture:" in them we find the banner stone, the drill, pottery and possibly several forms of chipped tools none of which are represented in the Trenton culture. Furthermore we must remember that the lower Rancocas horizon is probably a ceremonial site, and as such, we suspect, does not represent the totality of that culture. As against the meagerness of the Trenton culture the disparity of these cultures is glaringly apparent. Nor does the citation of other sites where argillite alone occurs increase the probability of their identity, for just such heterogeneous material is avowedly included there.

If then the finds of Messrs. Hawkes and Linton are not to be considered as a local example of the Trenton "argillite culture," nor necessarily as a direct outgrowth from it, what is their significance? The authors have contributed a unique and important find, a new culture in New Jersey. Their work includes a detailed description of the objects comprising that culture (or cultures?), although a more detailed description of the ceremonial site itself would have been of value. Inasmuch as Dr. Abbott and others have reported occurrences of similar material along Rancocas Creek, we may anticipate the development of an extensive area in which this culture occurs.

LESLIE SPIER

ASIA

Indien und das Christentum. Eine Untersuchung der religionsgeschichtlichen Zusammenhänge. RICHARD GARBE. Tübingen, 1914. viii, 301 pp. 22×14.5 cm.

This volume presents a collection of essays revised and partially rewritten, which the distinguished author, professor of Sanskrit at the University of Tübingen, had previously published in various journals, and several of which have been rendered accessible to the American public in the *Monist*. The book is divided into two sections,—India's influence on Christianity, and Christian influences on Indian religions. It is accordingly the author's object to study the interrelations of India and the West in the field of religious history. If this work is here brought to the notice of anthropologists, it is chiefly for the reason that it offers an interesting contribution to the methodological study of the vexing question of borrowing or independent origin, which almost daily confronts every one of us in his particular branch of work. It is well known that many a hot battle has been fought over the theory that Buddhism should have exerted its influence on early Christian thought, particularly on the later uncanonical or apocryphal Gospels. R. Seydel (died 1894), who was the first to treat the subject methodically, advanced fifty-one parallels to prove dependence of the Gospels on Buddhist literary sources. Bergh von Eysinga founded his thesis on only six coincidences which he attributed not to written productions, but to orally transmitted themes. Many Indianists and theologians remained skeptical and pointed to the congenial character of the two religions or the similar social conditions in which Christ and Buddha moved. Garbe retains four parallels between Buddhist and Christian stories, as far as the canonical Gospels are concerned: (1) the Buddhist story of the venerable saint Asita and his glorification of the newly-born infant Buddha, compared with the Christian story of Simeon in the temple (Luke, II, 25); (2) Buddha's temptations by Māra ("the Evil one") and Christ's temptation by Satan; (3) Peter's walking over the sea (Matthew, XIV, 25) and Jātaka, No. 190, where a disciple of Buddha, unable to find the ferry, crosses a river on foot, begins to sink in the stream, but reaches the other bank by virtue of his faith in Buddha; (4) the bread miracle of Jesus and Jātaka, No. 78, where Buddha satisfies with a single loaf his five hundred disciples and all inmates of a monastery, so much bread being left that it is thrown into a pit beside the gateway. According to Garbe, the mutual resemblance is less striking for the sake of the miracle itself, but rather

owing to the feature that also in the New Testament twelve baskets of crumbs are left and the number five is retained. The smaller number of five hundred in the Buddhist story, as compared with five thousand in the gospels, who are fed with five loaves, according to Garbe, bespeaks the character of originality, and the number five hundred is eminently Buddhistic. The Buddhist text should therefore be regarded as the source of the Christian version. In these four cases, Garbe infers, Buddhistic influence on the New Testament must be acknowledged, and hence the supposition cannot be suppressed that this influence has been evident also in other passages of the Gospels where it cannot be proved with the same degree of probability. It should not be difficult to theology, Garbe thinks, to become reconciled to this idea from which the eternal values of Christianity will not have to suffer.¹

I am in accord with the author in his assumption of Indian influences upon the Alexandrian Physiologus, and hope to furnish several other contributions to this question (aside from the story of the rhinoceros previously pointed out by me and reproduced by Garbe), but I do not believe that the story of the lion that awakens his stillborn cub with his roaring voice on the third day goes back to a Buddhist notion, as Grünwedel has asserted. At the outset it is not plausible that any symbolical allusion to the lion in the domain of Christian thought is of Indian origin: the lion plays a predominant rôle in the Semitic and classical worlds, in literature as well as in art. The lion is the type of the tribe of Judah (Genesis, XLIX, 9), and since Christ is descended by David from that tribe, he is styled "lion from the tribe of Judah" (Revelation, v, 5). The case of the Physiologus, however, is specific and well-defined, and any corresponding parallel to it does not occur in India; thus the question may be

¹ In discussing the Hebrew and Indian parallels of the story of Solomon's judgment, Garbe (p. 27) goes astray in assuming that, as long as merely the Tibetan version in the Kanjur was known, the opinion would have been justified that the story had penetrated into Tibet through Christian mediation; again, on p. 29 (note), he asserts that it migrated from India by way of Tibet into China. The reverse, however, is the case: the Chinese rendering of the story is the older one, and from the Chinese it found its way into Tibetan literature. The Tibetan story is incorporated in a collection of Buddhist Jātakas, which has become well known through the edition and translation published by I. J. Schmidt in 1843. It is now perfectly assured that this Tibetan work was translated from the Chinese by Chos-grub, a Tibetan scholar, who lived in the first half of the ninth century. The Chinese original itself is rendered after a work edited in the year A.D. 445, or shortly before, at Turfan, Turkistan, by Buddhist monks. The starting-point of the story for the east Asiatic world, accordingly, was India, whence it migrated to Khotan and Turfan, and finally to Kan-chou in Kan-su, the domicile of Chos-grub.

raised as to whether the notion of the lion awakening his stillborn cub has not existed in the western part of the world in pre-Christian times, for we meet curious conceptions regarding the parturition of the lioness in Herodotus (III, 108), the first ancient author who discussed this subject.

While Buddhist influence on the canonical Gospels must still be regarded with restraint, as long as we lack the documentary evidence showing how such literary or oral transmissions from India into Syria could be brought about, there can be no doubt of an extensive Buddhization of the so-called apocryphal Gospels coming down from the third to the sixth century and swarming with fantastic and adventurous miracle stories. Most of these books are of Gnostic origin, and as has been recognized at an early date, the Gnostic sects have largely borrowed from Buddhism. Garbe makes the interesting point that the sparse Buddhist stories adopted into the canonical Gospels (if this be correct) belong to the original and older form of Buddhism, the Hīnayāna, whereas the source for the uncanonical Christian writings is presented by the Mahāyāna, the new development of Buddhism in northwestern India during the first century before and after our era. It is generally known that a Bactrian monk of the sixth century utilized the legends of Buddha for a Christian romance under the title Barlaam and Joasaph, which has found its way into all European literatures. Garbe recapitulates in particular the Christian legends of St. Eustachius and St. Christophorus, which without any doubt are traceable to Buddhistic motives. It seems to me, however, that the story of Sutasoma was not the direct prototype of St. Christophorus, but that we have to look for a missing link in western Asia which is still unknown.

With many others Garbe believes also in Buddhist influences on the forms of worship in the Christian Church: the convents with their monastic life and division of novices and ordained monks and nuns, celibacy and tonsure of the clergy, confession, cult of relics, rosary, church-towers, employment of incense and bells, are to be ascribed to an impetus received from corresponding institutions of Buddhist India, which transmitted to Persia, Bactria, and Turkistan came in contact with Christian sects. The possibility and probability of such derivations cannot be denied, but for each case a profound and detailed investigation will be required. The nimbus has not its origin in classical antiquity, as asserted by the author, but in Babylonia, whence it spread to Iran and India on the one hand, and to the west on the other.

In the second portion of his book, which deals with Christian influences on Indian religions, Garbe is less fortunate than in the first. In

his critical discussions he shows at his best, and his analysis of the Thomas legend and the history of the Thomas Christians in southern India forms one of the most attractive chapters. I do not comprehend how Garbe (p. 179) gets at the statement that in Chinese art Buddha is represented as a fisherman with rod and hook, and that this is due to a transmission of Christian symbolism, because fish-catching is an un-Buddhistic action. What is known to me only are representations of the Bodhisatva Avalokiteṣvara (Kuan-yin) as either traversing the ocean on a fish or carrying a fish in a basket (see illustrations, for instance, in *Open Court*, 1911, pp. 388, 389). This deity is also the protector of mariners and the lord of the sea, hence a sea-fish has become his attribute, and this surely has nothing to do with Christian ideas.

The author's remarks on the influence of Christianity on the Lamaism of Tibet are weak and ill-founded. Only secondary and partially dubious sources have been consulted, and even those not very critically. Garbe (p. 184) repeats after Grünwedel that Odoric of Pordenone visited Lhasa in 1330 and found there already Christian missionaries and some proselytes. However, the reviewer has shown in an article in the *T'oung Pao* (1914, pp. 405-418) that Friar Odoric had never been in the interior of Tibet, and that it is out of the question that he ever reached Lhasa: he himself in his account lays no claim to this honor (the very name Lhasa is not even mentioned by him), and he has nothing whatever to report concerning Christian missionaries in Tibet. How Grünwedel could ever advance such a statement, is a mystery. This, then, cannot form a link in the chain of alleged evidence for Christian influence on Tibet, still less than the assertion that the possibility of such interaction on the Buddhism of Tibet and China exists *nachweislich* from 635; for, according to Garbe, in this year a Nestorian mission is attested which under the guidance of A-lo-pen betook itself "into those countries." This fact is brought out in the famous Nestorian inscription of Si-ngan fu, erected in A.D. 781; and he who knows what an immense literature has been produced on this unique monument will be not a little surprised to note that Garbe draws this fact from such a compilation as Waddell's *Buddhism of Tibet*. A-lo-pen's journey from Syria to Ch'ang-ngan, the then capital of China, cannot be invoked, as has been done by Garbe, as capable of proving Christian influence on Tibet; for the Nestorian A-lo-pen did not touch Tibet, but took the route common at that time by way of Turkistan. Through failure in verifying his sources, the author has unfortunately become the victim of a much more lamentable error: he thinks that the mission of A-lo-pen was received in the year 639 in northern India by the

celebrated King Çilāditya. The authority cited for this statement is a note in Takakusu's translation of the journey of the Chinese pilgrim I-tsing, where it is remarked, "Dr. Edkins says that Çilāditya received the Syrian Christians, A-lo-pen and his companions, A.D. 639 (*Athenaeum*, July 3, 1880, p. 8)." The article referred to contains a review of Edkins' well-known book, *Chinese Buddhism*, in which on p. 117 occurs the sentence, "The same emperor, T'ai-tsung, received with equal favor the Syrian Christians, A-lo-pen and his companions, who had arrived in A.D. 639, only seven years before Hsian-tsang's return." Edkins, accordingly, lisps no word about the Indian King, Çilāditya, but only speaks of the reception which A-lo-pen met with in the capital of the Chinese Emperor T'ai-tsung. The date 639, however, is wrong: A-lo-pen arrived at Ch'ang-ngan, according to the Nestorian inscription, in 635. What happened in 639 was the promulgation of an imperial edict issued in favor of the Nestorians and granting them permission to build a Syrian church in the metropolis of China. Consequently, in that year, A-lo-pen resided at Ch'ang-ngan, and cannot be located anywhere in India. The alleged fact of the presence of Nestorians at the Court of King Çilāditya in 639 does not exist: Takakusu has wrongly copied the passage of the *Athenaeum*, and Garbe was unfortunate enough to rely upon him, the more so as the error of his informant had already been detected and exposed by M. L. Ettinghausen (*Harsa Vardhana*, p. 92, 1906) and G. A. Grierson (*Journ. Roy. As. Soc.*, 1913, p. 144). Still more unhappily, Garbe (p. 259) is ready to base another far-reaching conclusion on this alleged "first Nestorian mission in mid-North-India." This concerns Christian influences on the Krishnaism of India, which, for that reason, are asserted to have taken effect in the first part of the seventh century. This entire speculation is naturally bound to collapse. There is no evidence whatever that such influences operated, or might have operated, in the India of the seventh century; and, in the reviewer's opinion, they belong to a much more recent, nay, to a very recent period. Be this as it may be, Garbe's attempt to prove a contact of Tibetan culture with Nestorians is no more felicitous than that of any of his predecessors along this line: not a scrap of matter-of-fact evidence has as yet come to the fore to warrant the conclusion that Nestorians have ever set foot on Tibetan soil. Allegations made to this effect are speculative dreams of people who seem to have time to waste. In the same manner as several earlier writers, Garbe is likewise inclined to assume an extensive influence of Catholicism on the cult and rites of the Lamaist Church. The reviewer who has devoted some attention to the study

of Lamaism for twenty years is now more skeptical than ever before as to any coincidences pointed out in this direction. Above all, it should be borne in mind that we have at the present time merely a surface knowledge of Lamaism, and that the whole ceremonial has never been seriously and intensively investigated. Without the solid basis of such research, historical and critical, founded on indigenous sources, the ventilation of this question is hopeless. The outward resemblances and affinities on both sides may well exist; but every ethnologist is now sufficiently schooled to appreciate the value of such fortuitous coincidences. We have witnessed too many failures and downfalls of bulwarks of comparative ethnology to be easily ensnared now in such traps. A close study of Lamaist rituals and ecclesiastic history and organization will in all probability bring out the fact that their psychological foundation, their origins and developments, are totally different from any corresponding affairs of the Christian Church. Even now it is perfectly safe to venture the positive assurance that the office of the Dalai Lama, for instance, is as remote from the papal institution as the moon from this globe. The alleged Manicheism of the Tibetans, which has been discussed again by Chavannes and Pelliot (*Un traité manichéen retrouvé en Chine*, pp. 274-278) with negative result, is not touched upon by Garbe, nor has he any knowledge of some real Christian traces found in certain Tibetan legends of Padmasambhava and Milaraspa, to which Grünwedel and the writer have repeatedly called attention.

The alleged Christian elements in the Mahābhārata treated in the following chapter are no more convincing than the invasion of Tibet. The Indian epic tells a legend concerning the Ṣvetadvīpa ("White Island," or "Island of the Whites"), located over 32,000 miles north-east or north of Mount Meru, on the northern border of the Milky Sea. The white, bright-shining inhabitants of this country are supernatural beings without sensual organs, living without food, fragrant and sinless, blinding with their splendor the eyes of wicked men. Being prompted by supreme love of the one invisible god Nārāyaṇa, they adore him with gently murmured prayers and folded hands. None of them occupies a prominent position, but all enjoy the same authority. These latter data impress Garbe as being due to the contact with a Christian community. Though he regards Christian influence in this case only as probable, he construes an elaborate theory, identifying the Milky Sea with Lake Balkhash and establishing there Nestorian settlements in the sixth century A.D. Unfortunately, this assertion is not proved; at that time, the Nestorians had not yet advanced as far as Lake Balkhash, but were

restricted to eastern Iran (see now Pelliot, "Chrétiens d'Asie centrale et d'Extrême-Orient," *T'oung Pao*, 1914, pp. 623-644). The whole theory is a romance which must be decidedly rejected. The Nestorians have to cover a multitude of sins, and like the gypsies in Europe, are employed in Asia on the scholarly chessboard to explain movements of which we are still ignorant.

Garbe's work should be read by our folklorists, not for the results achieved, but for its stimulating qualities. It is a well-written summary of the present state of the problem, and his discussions are always interesting and suggestive.

B. LAUFER

Dravidian Gods in Modern Hinduism; A Study of the Local and Village Deities of Southern India. WILBER THEODORE ELMORE. (University Studies, published by the University of Nebraska. Vol. xv, No. 1, January, 1915.) Pp. 1-149.

This study, in part based on personally gathered data, supplies the student of Indian religions with a considerable mass of new and valuable material. While scattered observations on the local and village deities of southern India are available, few general discussions of them and their place in the Hinduism of this part of India have hitherto been attempted.

In the first chapter, in which a brief outline is given of the Aryan conquest of Dravidian India, the author's statements are in several cases open to criticism. Thus, he is far too sweeping in denying any literature to the Dravidians, and entirely in error in stating that they "left no monuments which throw light on their origin." Southern India, as is well known, contains great numbers of prehistoric sites of archeological importance for the history of the early Dravidian population, although as yet these cromlechs, graves, and other types of remains have not been systematically or scientifically investigated. The author is also unfortunate in giving the impression that there were in India before the Aryan immigration, only Dravidian-speaking people. The whole Munda group—once occupying a large part of central and northern India—is entirely omitted from consideration, and its part in the development of modern Hinduism is wholly neglected.

When the author comes to deal with the specific subject matter of his study, he is on much surer ground, and deserves much credit for the care with which he has gathered and marshaled his material. Pointing out that the characteristics of these deities of the common people (as contrasted with those of the orthodox Hindu pantheon) lie in their local

and often ghostly origin, their prevailing female sex, and their fondness for bloody offerings, he proceeds to consider in order the various classes into which these supernatural beings may be divided. In the great majority of cases, the deities are represented both in their simple shrines and in special ceremonials, by crude images of stone or clay, or even by rough, unshaped stones alone. In many instances, the being is induced to enter into the image for the occasion of a ceremony only, and after this is over, the image is either abandoned or destroyed. Sacrifices, usually very bloody and cruel, are an important part of the ritual of nearly all the deities, in contrast to the usual Hinduistic practice. In rare cases human sacrifice is in use, the victims being stolen for the purpose. It is curious that in discussing in this connection human sacrifice in other parts of India, the author makes no mention whatsoever of the highly developed and well-known practice of it among the Khonds, a Dravidian group in the neighboring division of Orissa.

In many of the rites the preparation of one or more *muggus* or ground-paintings made with powdered lime or rice-flour, is an essential feature. They appear to be both decorative and symbolical, but no special study of them seems to have been made. Inspired prostitutes or feminine shamans belonging to the lowest castes play a large part in many ceremonies, and on these occasions are entitled not only to touch, but to spit on persons of the highest castes, who, under other circumstances, would rather die than suffer such defilement. A large proportion of the supernatural beings to which offerings are made and in whose honor ceremonies are held, are purely of human origin. They are the spirits or ghosts of particular individuals, revered or feared after their death, and are in process of making in many villages at this day. A goodly mass of valuable and detailed information is given in regard to the many ceremonies and beliefs associated with the various types of supernatural beings, and to this is added a considerable body of legends and myths, partly of native and partly of Hindu origin. In this concrete and descriptive part the greatest value of the paper lies.

In the chapter on "The influence of Dravidian Deities upon Hinduism" the author, as in his introductory chapter, lays himself more or less open to criticism. While rightly pointing out that in the Hinduism of southern India there is a vast mass of unassimilated Dravidian beliefs and practices, existing side by side with those of Hinduism proper, he fails to call sufficient attention to the profound extent to which modern Hinduism itself is the result of the absorption and assimilation of Dravidian and Munda beliefs by the older Vedic religion. In his last chapter,

dealing with the fundamental conceptions of Dravidian worship, the author labors a little needlessly, it seems, to show that the sacrificial features do not have any totemic origin, but are merely propitiatory. The conclusion that *all* of the Dravidian deities are derived from ghosts seems doubtful, although it is clear that a large proportion, if not all of the lesser and more local beings, are of such an origin.

R. B. DIXON

AFRICA

Verbreitung und Formen des Totemismus in Afrika. BERNHARD ANKERMANN. (*Zeitschrift für Ethnologie*, Vol. 47, 1915, pp. 114-180, with map.)

In this article the author of "Kulturkreise und Kulturschichten in Afrika" (*Zeitschrift für Ethnologie*, vol. 37, 1905, pp. 54 *seq.*) and of "Über den gegenwärtigen Stand der Ethnographie der Südhälfte Afrikas" (*Archiv für Anthropologie, Neue Folge*, vol. IV, pp. 241 *seq.*) summarizes most successfully all the available data on the distribution and varieties of totemism in Africa. After a passing reference to Frazer whose *Totemism and Exogamy* proved most serviceable as a collection of material, and to Goldenweiser, with the principles of whose *Totemism, an Analytical Study* Ankermann agrees, but whose definition of totemism he rejects as non-productive of further research, the author proceeds to formulate his own conception of totemism, as follows:—

Totemism is the belief that a group of blood-relatives (a clan) stands to a species of animals, plants, etc., in a specific, permanent and indissoluble relation, which is usually conceived of as blood-relationship and imposes upon both parties, certain obligations (p. 116).

It will presently be seen that this one-sided emphasis on one particular aspect of totemism as the essential one results disastrously for Ankermann's theoretical discussion of African totemism.

The distribution of totemism in Africa is indicated on the map (*q.v.*). Tables I and II (pp. 130-1) representing the totemism of twenty-six tribes bring the following results as to the kind of things that appear as totems in Africa:¹

¹ In order to obtain from the above lists the number of different plants, animals, etc., which occur as totems in the twenty-six tribes, the figures must be reduced by the number of occurrences of each variety of animal, plant, etc. These figures are also given in the author's tables. The figures as given above, however, also have their psychological significance in so far as they indicate the relative tendency of the different things to be taken as totems. A truer picture of this would result if the phenomenon of diffusion were taken into account, as well as the number of animals, plants, etc., known to the natives, which thus become available as totems.

TABLE I

451 animals
24 parts of animals
67 plants
22 celestial bodies
65 miscellaneous

The animals are distributed as follows:

TABLE II

281 mammals
71 birds
63 amphibia and reptiles
19 fishes
18 insects and
4 other animals

The totem in Africa is usually conceived as a friendly related being (p. 143), but also as something dangerous, proscribed, to be evaded, or again as introduced by a god, culture hero or ancient ruler. There seems to be no separate term for totem, instead a relationship term is used (p. 144) or a phrase implying something forbidden, proscribed. Specifically totemic rites are either absent (p. 145) or at most play but a secondary part in the complex of totemic practices and beliefs. If any attitude towards the totem is typical of Africa, it is that of taboo, the prohibition to eat or kill the sacred thing. The totem and the totemite are supposed to be mutually helpful, while the emotion aroused by the totem is either that of respectful awe or a sort of fear (p. 146). In some cases the totem is buried, invited to weddings. In a few instances the clan-mates are believed to have a magical influence over their totem. The authenticity of the few recorded instances of a sacrificial eating of the totem seems to remain doubtful. The punishment for transgression of a totemic taboo is of the so-called automatic type and the form it takes is usually that of skin-disease. There appears to be no punitive reaction on the part of the group, although the killing or expulsion of the culprit seems to have occurred in the past. Commonly, but by no means universally, the social unit derives its name from the totem (p. 155). The descent of the totemic social unit is in Africa almost throughout paternal, with a few instances where different conditions prevail, such as in the case of the Tshi and Ewe, where both the maternal and the paternal totems seem to be hereditary; the Bakongo, Bavili and Herero, where the totem is inherited through the father, although the children belong to the clan of the mother; the Atchewa and Awemba, who seem to have maternal descent of the totem.

The relation of totemism to exogamy in Africa is highly instructive (p. 161 *seq.*). Among some of the totemic tribes exogamy is not recorded, the majority of tribes, however, have as elsewhere, both totemism and exogamy. In all such instances, as the author points out, it is important to ascertain whether the totemism and the exogamy refer to the same social unit. Now, this is by no means always the case. The Nandi, for instance, are divided into totemic but non-exogamous clans which are themselves subdivided into non-totemic but exogamous families; among the Herero, Bakongo and Bavili the paternal social unit is totemic while the maternal one is exogamous; among the Wahehe several of the gentes have the same totem, they may nevertheless intermarry; among the Banyoro gentes have the same name but different totems while others have the same totem but different names, but all are strictly exogamous,



FIG. 77.—Distribution of totemism in Africa. The black areas indicate tribes where totemic and exogamous units do not coincide. (After Ankermann.)

etc. In all such instances the author does not fail to see confirmation of the opinion, now shared by Frazer, that totemism and exogamy are genetically distinct (see map, fig. 77).

Up to this point Ankermann's contribution must be recognized as

excellent and most useful. The author's attempt at a theoretical interpretation, on the other hand, seems far less successful.

The author is certainly right in pointing out that neither ancestor worship nor even animism, both highly prevalent in Africa, need be regarded as of the essence of African totemism, speaking genetically, but that these features must rather be conceived of as secondarily associated with it. The author also takes a guarded attitude with reference to the relation of totemism to the so-called "bush-souls," as well as in the question of the possible development of gods out of totems.

Admirable also is the attitude taken towards totemism as a process of socialization (p. 172). The totem, says Ankermann, is the badge of a social unit, the clan, but it has no other social significance; tribes exist which have no totemism, but whose social organization is indistinguishable from that of totemic tribes. As to the undeniable frequency of the association of totemism with exogamy, "the cause of it must be sought in the fact that both are so often and probably were from the earliest times on the marks of the same social aggregate, the kinship group."¹ In the present state of our knowledge even this statement does not seem strong enough, for in an ever growing number of instances the association of the totemic clan with exogamy proves to be more apparent than real, the exogamy of the clan being a derivative feature. Almost the whole of the Australian area and large sections of North America bring abundant confirmation of this statement.

It was noted before that the totem in Africa descends almost invariably through the father. Ankermann therefrom concludes that such is the primal form of the institution, that totemism must have originated in a paternally organized society (p. 173). Then the author proceeds:

I regard localized totemism as the original form; its breakdown seems to me to have been determined by the clash of two systems of descent, the paternal and the maternal. The latter finally was probably in all cases conditioned by the mixture of peoples and cultures (p. 173).

Through such mixtures the author also explains all instances of double descent recorded in Africa.

The next question is: What culture stratum must be regarded as the

¹ It is particularly gratifying to the present writer to note that Ankermann clearly distinguishes between the social aspect of totemism, the fact namely that it represents an instance of socialization of certain traits within the limits of definite social units, and exogamy. It will be remembered that in his original treatise Frazer regarded exogamy as the social aspect of totemism, the attitude towards the totem constituting the religious aspect. The two viewpoints are not always kept apart even at this time, and regrettable confusion results.

carrier of African totemism? (p. 174). One criterion the author believes to have found in the concept of blood-relationship with the totem. Where this is present, we are likely to be on the track of the totemic culture.¹ Another criterion is sought in the association of the totem with the kinship group, the clan or gens. If this is to be regarded as a primal trait, then its presence may indicate the totemic culture. Now, as stated before, a series of tribes extending intermittently from the Gold Coast to German Southwest Africa possess paternal totemic social units on the one hand, and, on the other, exogamous maternal non-totemic ones. In another series of tribes extending from the Nandi to the Bechuana, as well as among some tribes of the northern Congo area, the totemic unit is wider than the exogamous kinship group. Now, the totemism in both cases may have been brought by the same people, the differences being due to the cultures of the peoples with whom the totemic tribes amalgamated. The question remains: Who were the people who brought totemism? If the original cultural layer is assumed to have been characterized by paternal descent, exogamy, and totemism, then the extension of the totemic unit beyond the exogamous one cannot be accounted for. Hence, the author assumes that the original indigenous cultural layer had the non-totemic exogamous gens, upon which was superimposed the totemism brought by another people. Now, the peoples from the Nandi southward all have a Hamitic strain added to the original Negro population. Hence the Hamites must have been the carriers of totemism. Assuming this to be so, then the totemism of ancient Egypt, if indeed it existed, must also have been of Hamitic origin; for contact with Negroes, who might otherwise have been regarded as responsible for Egyptian totemism, does not seem to antedate the year 2,500 B.C.

The author concludes these speculations with the remark:

Unfortunately the entire construction is hypothetical and does not allow of proof. Hence we must be satisfied to regard it as conjectural, and perhaps as an incentive to further research. Meanwhile the problem as to the age of totemism in Africa will remain unsolved. We must look for traces of totemism among Hamitic peoples (*sic!*); particularly desirable would be more definite data on the Fulbe, who are supposed to be totemic (p. 178).

It will thus be seen that the author's dogmatism is of a mild variety. This non-aggressiveness discourages severe criticism. He even goes so

¹ In one other instance the author uses this concept of blood-relationship with the totem in a methodologically unjustifiable way. Whether totemism did or did not exist in ancient Egypt, may remain uncertain, but its presence cannot be denied on the sole ground that no belief is recorded in relationship with or descent from the totem (p. 172).

far as to follow up his theory with a reminder that the totemic culture of Africa reveals a set of striking similarities to the so-called West Papuan or Totemic culture of Oceania. The assumption of a genetic relationship between these two cultures would hardly be reconcilable with the theory of the Hamitic origin of African totemism. The author is therefore willing to admit that

for the present we must assume that totemism is an indigenous Negro institution, while attempting to find another explanation for the peculiarities of the Nandi and other similar systems (p. 178).

All this notwithstanding the author's Hamitic theory of African totemism must be classed as another example of the diffusion dogma of the Graebnerian type. Why assume that the presence of maternal and paternal descent in one tribe must be due to "the mixture of peoples"? What is the proof that primal totemism was paternal and local, and that the typical distribution of totemic clans over many local groups was again due to "the mixture of peoples"? Why posit one particular culture as the carrier of totemism, and why identify that culture with one people? To all these queries the critical ethnologist has but one answer.

Before closing I should like to express the regret that the author should not have supplemented his exhaustive and highly instructive study of the distribution and character of totemic features in Africa with an intensive study of a number of integral totemic complexes and another comparative one of the relation of totemism in Africa to religious societies. The material for such investigations is now available, and not until they are carried out may we hope to reach a deeper comprehension of the significance and specific peculiarities of African totemism.

A. A. GOLDENWEISER

PHYSICAL ANTHROPOLOGY

Indian-White Amalgamation. An Anthropometric Study. ALBERT ERNEST JENKS. (Bulletin of the University of Minnesota, Studies in the Social Sciences, No. 6, Minneapolis, 1916), vi, 24 pp., 17 tables. 6 plates (including one of graphical illustrations of measurements).

Supposed irregularities in the sale of certain lands on the White Earth Reservation, Minnesota, allotted originally to mixed-blood Indians by the Government which, in 1906-1907 authorized them to sell those lands, occasioned the present investigations. Being called upon by the attorney for the defendants to determine the blood status by anthropometric methods; when Indian testimony as to genealogical data of the originals fellers did not prove very trustworthy, the author visited

several reservations. In addition to his studies on the White Earth Reservation, several others in Minnesota and one in North Dakota were visited. Physical features under consideration were the head breadth and length, face breadth and height, nasal breadth and length, color of eye, skin and hair, texture and quantity of hair, and nature of incisors. The present paper contains only the results of face and head breadth measuring, and the cranio-facial index¹ taking both in rationally. The other somatological observations mentioned above, which are of most decisive value in the analysis of blood mixture, are reserved for a later publication. They will in fact be very essential for the determination as to Indian-White, Indian-Negro, or Indian-Negro-White mixed-bloods. To what extent mixed-bloods predominate in the regions examined is shown by the statement that among more than three hundred Ojibwa Indians "the pure-blood type was chiefly noticeable by its absence." The historical sketch of amalgamation and the records of the famous Warren family (pp. 2-5) show that the influx of foreign blood by the trading people has been continuous and at times even excessive for over 250 years. "It was the rare and exceptional trader who did not have at least one Indian wife." The physical characteristics of pure-blood Indians and those of mixed blood are precisely defined. Of interest is the statement that all types of noses are found, a fact by which the close observer is generally considerably puzzled. I have found on the other hand that in spite of its far-reaching variety the form of the nose is a fairly conservative trait by which racial analysis should profit greatly. And even if "there is no typically Indian form about Indian noses" (p. 6), its derivation might be greatly aided by form-analytical methods. The author states that offspring of the Indian and White amalgamating stocks assume modified characteristics in direct ratio with the preponderating inheritable influence of either of the two parent stocks over the to Morton's, Starr's, and Hrdlička's results. It should have been made other.² A number of excellent photographs tend to show such modifications. Still, they do not suffice for an exhaustive treatment of the problem and we are looking forward to a metrical color and form-analytical determination in a later publication.

In carefully arranged tables the head and face breadth, their differ-

¹ As "cranium" should refer solely to the skull, a better term for this index might be employed, with recourse to the Greek word for head, ἡ κεφαλή, viz., "cephalo-facial index," which in this case is a "transversal" one.

² Boas in his paper of fundamental value: "Zur Anthropologie der nordamerikanischen Indianer," *Zeitschrift für Ethnologie*, 1895, pp. 366-411, speaks directly of the "grössere Einfluss des indianischen Typus auf die Mischrasse" (p. 410).

entials, and the cranio-facial indices are laid out individually and averaged. The mean variation also is given. The author has also recourse plain, though, that Morton's figures as being derived from the skull are not directly comparable to somatological ones. Consulting his results, the author calls attention to a modification of constant repeating, *i. e.*, the relation between the breadth of face and breadth of the head (the face-breadth head-breadth index—cranio-facial index). The breadth of the head as well as that of the face increases fairly gradually with the minor degree in mixture, or perhaps it is better to say that the influx of white blood exercises a modifying effect on the breadth of the head and face of the Indian. According to the author's own figures, the head-breadth ranges from 151.4 mm. to 156.8 mm. for the males and from 150.0 mm. to 153.3 mm. in the females, the face-breadth correspondingly from 136.8 mm. to 152.0 mm. and from 132.2 mm. to 144.0 mm., according to the percentage of mixture involved. But more indicative is the mutual relation of these two series of numbers in their differentials within the different groups in a perfectly gradual accession of from 4.4 mm. to 14.6 mm. in the male groups, and from 6.0 mm. to 14.6 mm. in the female ones, resulting in cranio-facial indices of from 97.19 to 90.34 male and from 96.05 to 88.16 female. As chief factors in the amalgamation were included: pure-blood Indians, French, and Scotch; mixed-bloods less than half white, half or more white, and three-fourths or more white. These conditions are graphically represented in three series of frequency curves. Evidently by mistake the series of head and face breadths were exchanged on this chart so that figure 2 should be figure 1 and *vice versa*.

It is demonstrated that the cranio-facial index is a highly valuable element in hybrid study, which is still in its infancy. Still, a valuable beginning has been made here and abroad and special stress must be laid on following up such studies in addition to measurements, on purely somatological and physiological research, as the author himself proposes. There is at present a strong tendency in the anthropological field to exploit the problem of the hybrid as a result of a perfectly sound and sane development of our science. Biological experimentation and its elaboration into theories have prepared the ground. Every attempt to illuminate the problem will for such reasons be heartily welcomed.

BRUNO OETTEKING

Studies on the Evolution of Primates. Part I. The Cope-Osborn "Theory of Trituberculy" and the ancestral molar patterns of the primates. Part II. Phylogeny of recent and extinct anthropoids with special reference to the origin of man. WILLIAM K. GREGORY. Bulletin of the American Museum of Natural History, Vol. xxxv, Art. xix, 1916. Pp. 239-355.

About a century ago the great C. G. Cuvier demonstrated before an assemblage of scientists that the systematic position of a fossil can be determined from the structural peculiarities of the teeth. Before their eyes he laid bare the skeleton embedded in a gypsum rock of an animal which, from a single tooth, he had recognized as a marsupial. Proving thus his "law of correlation," it was he who first conceived the idea of a comparative treatment of paleolithic vertebrate zoology, supporting it by his profound knowledge and the courage of his convictions. It is the teeth that in consideration of their high diagnostic value have since formed a favorite object of investigation. Dr. Gregory's present treatise is based on such evidence, but not exclusively so. His observations on general structural peculiarities and adaptive changes of the groups examined demonstrate an exceptional competency and knowledge as well as an intuitive ability to view biological conditions from the evolutionary and selective points of view. Approaching his publication from these grounds we find accumulated a vast amount of deductive argument as to the morphological side of his theme. As they represent to a large extent the author's own observations their scientific value is of still greater significance.

Part I contains a critique of the Cope-Osborn "Theory of Trituberculy" and its adaptation to the molar patterns of primates. With "Trituberculy" as the original pattern of all mammal teeth fairly universally adopted, the better comprehension of evolutionary facts suggested a nomenclature for the cusps of molars which would be entirely adequate and far more so than a purely descriptive one. Such a nomenclature was introduced by H. F. Osborn as early as 1895. Different speculations on and modifications of the theory of trituberculy have been widely discussed and are still being debated. An acceptable explanation of growing complexity of teeth in the upper antero-posterior line is offered in the so-called "Premolar-Analogy" theory, which holds that in placental mammals the paracone (upper outward cusps forward) is usually homologous with the originally haplodont (single cusps) crown of the reptilian teeth. Plate I shows the application of this theory on a number of tooth rows, tracing and identifying the derivation of cusps by means of guiding lines.

In Part II all the recent and extinct anthropoids are reviewed and phyletically traced up to the *Hominidae*, as described in the works of Schlosser, Strömer, Abel, Pilgrim *et al.* on European, Egyptian, and Indian fossils, and in many other well-known and exhaustive treatises. The classification of the order of Primates proposed by the author is another example of a careful survey of the entire field. It seems to be perfectly intelligible to range the *Adapidae* with the Lemuriforms since a close examination has justified this classification. The same holds true for the Tarsiiforms, even if one or another morphological detail should point towards remote anthropoidal relationship. It is natural that importance should be attached to these questions when it comes to revealing generic coherence of forms in the phyletic sense. *Parapithecus*, then, of the Lower Oligocene of Egypt—not of Europe as the printer would prefer on p. 336—is in the author's opinion the earliest known member of the anthropoid series. The fundamental pattern of its premolars and molars foreshadows the true anthropoid, while in *Proplioptithecus* of the same locality the specialization has increased towards the higher form. From here in the lower Oligocene the road divides, one leading over *Pliopithecus* to *Hylobates*, the other towards *Simiinae*, the latter producing the apes and *Hominidae*. The evidence extant does not suggest an earlier separation of the *Hominidae* from the *Simiidae* than in the Miocene period. Granted the existence of a common ancestor for anthropoids and man, there are among the numerous problems two that face the conscientious observer: one is the recognition of the ancestor's unspecialized form. Comparison teaches us the decided specialization of the higher apes to such an extent as to render retrospection very difficult if it were not that, with some reservations, embryological facts show a certain degree of uniformity. From this it would appear that man has in some important morphological peculiarities, especially in the skull and limbs, diverged the least. And here the second problem turns up in the lack of transitional forms in the human line, as the well-known fossils including the Piltdown skull seem to represent forms already specialized.

They leave no doubt that from a morphological point of view underlying each and every phyletic proposition that man's nearest kin are the anthropoids and that the separation from the anthropoid stem took place not in the "pre-lemuroid or even pre-catarrhine stage," but after the separation of the gibbon, which Keith goes so far as to attach to the cynomorphous group. The dentition indicates an evolution of the *Hominidae* over the frugivorous and omnivorous stages to that of

modern adaptation, where the teeth acquire retrograde characters on account of foodstuffs being prepared so as to require minimum effort. Such changes are closely correlated with those of modes of life, the two contrasting poles of which are the arboreal and the domesticated forms, also conditioning very decided changes in skeletal adaptation. The retraction of the face and the loss of the prehensile character of the hallux are the most significant ones.

Dr. Gregory's book is a distinguished example of the approach of phyletic problems by minute and comparative description, supported by explanatory illustrations. He consciously does away with methods of more exact representation by means of diagrammatic and mathematical devices. That such a solution is possible to a fair degree in a field of investigation dealing mostly with transitory fossil forms in view of a, for the time being, fixed biological final form, as represented by man in the phyletic sense, is fully shown in the author's work. It is in fact the most conscientious, resourceful and up-to-date comprehensive work, containing a wealth of acute morphological observations and clever deductive argumentation, that has come to my knowledge for some time. A few disdainful remarks on sciences that have to rely to some degree on exact methods, preeminently anthropology itself (pp. 250, 333, 341) cannot detract from the distinct value of his exposition. They only serve to show, besides forming an unnecessary diversion, a fatal misconception of the object and view of anthropology, whose chief task consists in analyzing a living form, as it were, even if it refers to historically extinct races. That this has to be accomplished with a consideration of all the biological perspectives that pertain to man's physical existence goes without saying. Paleozoological endeavors must naturally cease on the threshold of this science with its complexity of phenomena, but their excellent work in tracing the phyletic connections of man's ancestors should be appreciated without reservation, especially in the work here reviewed.

BRUNO OETTERING

MISCELLANEOUS

The Turquois. A Study of its History, Mineralogy, Geology, Ethnology, Archeology, Mythology, Folklore, and Technology. JOSEPH E. POGUE. (Memoirs of the National Academy of Sciences, Vol. XII, Part II, third memoir, Washington, 1915), 162 pp, 22 plates, one of which is colored, and 1 frontispiece in colors. 30X24 cm.

This splendid publication, the fruit of many years of assiduous and

painstaking research, is perhaps the most complete monograph that we possess on any precious or half-precious stone. In eight chapters, Dr. Pogue treats of the history of turquoise, its mineralogical properties, its geographical distribution, its origin and use, the chalchihuitl question, finally the importance of the stone in mythology and folklore, and its technology. A carefully drawn-up bibliography and a good index complete the volume.

It is certainly impossible for the reviewer, who is not a mineralogist, to review the mineralogical portion of the work; he must restrict himself to offering a few remarks on the history of our knowledge of the turquoise. With a great amount of industry Dr. Pogue (pp. 9 *et seq.*) has lined up sources and pseudo-sources relating to real and alleged turquoise in ancient times, but the history of the subject in Europe is not worked out with desirable lucidity. Galenus (pp. 12, 35) must decidedly be eliminated from the list of ancient authors who mention the turquoise of Nīshāpūr in Persia, for this statement emanates only from Ibn al-Baiṭār (1197-1248) and ranks on the same level with all other data attributed by Arabic authors to Aristotle or Galenus. Galenus, of course, never discussed the turquoise, still less could he speak of Nīshāpūr, as this city, founded by Shāpūr II (A.D. 309-379), did not yet exist in his lifetime (A.D. 129-199). No Greek author mentions the turquoise or any stone that might be interpreted as such; above all, Dioscorides is reticent about it. The only ancient author who has been credited with a knowledge of turquoise is Pliny; but in the reviewer's opinion Pliny's *callaina* and *callais*, which have been taken as such, in fact, have nothing to do with the turquoise. Dr. Pogue also feels that the alleged correspondence is far from satisfactory. There is an excellent criterion that may guide us in identifying Plinian stones, and this is the perpetuity of tradition in the East and West alike, as has been shown, for instance, by the writer in the case of the diamond. The Plinian tradition in regard to the stone *callaina* is perfectly isolated, however, and was not taken up, reproduced, or continued, by any Oriental or Occidental mineralogists. The Arabic records regarding turquoise make no reference whatever to classical authors, as they do in regard to so many other stones, but are plainly traditions which originated in the Orient itself. Pliny's successors, first of all, C. Julius Solinus, who has adopted nearly the complete list of his precious stones, and has contributed much to hand their knowledge down to the middle ages, has passed the *callaina* over in silence; indeed, he does not mention any stone that could be interpreted as the turquoise. In accordance with this fact, the French Bishop Marbodius (1035-1123), in his *De lapidibus*

pretiosis, is also silent in regard to the subject. Likewise the early French and German stone-books do not mention the turquois. Dr. Pogue (p. 12) informs us, however, that Isidorus of Sevilla (*circa* 570-636), in book 16 of his *De natura rerum*, alludes to the frequent use of turquois in the ears of Orientals. Unfortunately the source for this statement is not cited, while in all other cases Dr. Pogue very conscientiously quotes his authorities. Isidorus' work *De natura rerum* deals with cosmography and geography and consists of a single book, divided into forty-eight brief chapters. Chapter XVI treats *de quantitate solis et lunae* and contains nothing about the turquois or any other precious stone, nor does the remainder of the work. It is equally doubtful to me whether the definition of the turquois taken from an anonymous and undated Latin *lapidarium* (p. 13) can be really attributed to Albertus Magnus (1193-1280), as Dr. Pogue inclines to think. Albertus Magnus has written a treatise *De virtutibus lapidum*, inserted in his work *De secretis mulierum item de virtutibus herbarum lapidum et animalium* (the edition before me was published at Amsterdam, 1669); the turquois does not occur there, and here was the occasion to deal with it if Albertus had known it. Knowledge of the turquois in Europe did not spread earlier than during the thirteenth and fourteenth centuries. Du Cange (*Glossarium mediae et infimae latinitatis*) quotes a document dated 1347 as the oldest source for the word *turchesius* or *turcica gemma*. According to the *New Oxford English Dictionary* the earliest reference to turquois in English literature occurs in a work of 1398. We meet it also in the famous list of stones enumerated in Wolfram von Eschenbach's *Parcival* (791, 18). The Dictionary of the Spanish Academy (*Diccionario de la lengua castellan*, vol. VI, p. 379, Madrid, 1739) quotes as the earliest author to mention turquois (*turquesa*) Gomez de Tejada in his *Leon Prodigioso*. The earliest European writer revealed by Pogue is Arnoldus Saxo in his *De virtutibus lapidum*, where the stone is described as of a yellow color, verging on white. The question as to why the stone is called yellow is not discussed by Pogue, but this error surely testifies to the fact that these medieval writers knew the stone merely from hearsay. The statement of the early English author of 1398 is identical with that of Saxo and apparently derived from him. His text runs thus:

Turtogis that hatte Turkeis also is a yelow white stone and hath that name of the contrey of Turkeis. This stone kepeth and saueth the siyt and bredeth gladnes and comforte.

The derivation of the name of the stone from Turkey leaves no doubt that the first knowledge of it was transmitted from that quarter; and it is

further evident that European medieval knowledge of the stone hailed directly from the Orient, and was not connected with any tradition of classical antiquity. Consequently, the question as to whether Pliny knew the turquois or not, is irrelevant, as the subsequent generations owed him nothing along this line, but derived their knowledge exclusively from Oriental peoples.

The callean stone (καλλεανός λίθος) mentioned in the *Periplus* has no relation to Pliny's *callaina*. The identification of the two names rests on bad philology. It is quite certain that the term of the *Periplus* goes back to a Sanskrit prototype of the form *kalyāṇa* and means "excellent stone," or may refer to the city Kalyāṇa near Bombay, mentioned by Cosmas Indicopleustes under the name Kalliana (see Burnell, *Indian Antiquary*, vol. III, p. 310). It is equally certain that at the end of the first century A.D., when the *Periplus* was written, the turquois was wholly unknown in India and in all probability even in Iran. It was only the Mohammedans who introduced the stone into India, not earlier than the latter part of the tenth century.

Garcia da Orta in his *Coloquios do simples e drogas* (Goa, 1563) was the first to introduce the Arabic-Persian term in the forms *ferruzegi* and *puruza*, as he writes, and to interpret it correctly as the turquois, simultaneously refuting the previous error that this word should refer to the emerald. It was known to him that there was a great quantity of turquois in Persia, and with regard to its medicinal employment he comments that he was told by some people that it figures in the pharmacopeia among the Gentios (that is, Hindu), by others, however, that it does not. Among the Moors (that is Mohammedans) all say that it is used in medicine (see C. Markham, *Colloquies on the Simples and Drugs of India*, by Garcia da Orta, pp. 358-359). In fact, the medical utilization of the stone originated among the Mohammedans of western Asia, who introduced the practice into India. Garcia's statement shows that in the latter part of the sixteenth century the turquois was not yet officially admitted into the pharmacopeia of India, and that its medical employment was reduced to a minimum.

In regard to the antiquity of the turquois in Iran and the history of the mines of Nishāpūr I feel obliged to maintain strictly my former position in this question, and am not convinced by Dr. Pogue's purely speculative considerations to the contrary (p. 35). The point in historical problems is not what might have been, but what has been, and only facts and data carry convincing force. It is somewhat surprising to note how Dr. Pogue can advance the statement

That the deposits were worked about 2100 years B.C., is suggested by the name of one of its openings, called Isaac's Mine on account of a tradition that it was discovered by Isaac, the father of Israel, after I characterized this as a legend without historical value (*Notes on Turquois*, p. 42, note 2). Such modern legends connecting famous sites with names of the Old Testament exist by the thousands among the Mohammedans. In writing on the cultivation of the apple one might as well invoke Eve's apple as good evidence for the great antiquity of its cultivation.

In my *Notes on the Turquois* I dated the first acquaintance of the Chinese with the stone in the period of the Mongols, but there is now reason to believe that the latter were preceded by the Khitan (usually classified among Tungusians), who ruled China as the Liao dynasty from 907 to 1123. Officials of that dynasty are said to have worn girdles adorned with gold, jade, rock-crystal, and turquois. Thus far I have found this statement only in the *Sü wen hien t'ung k'ao*, written in 1586, but it remains to be traced in the contemporaneous records of the Liao dynasty, before it may be retained as a well-assured fact.

It is regrettable that Dr. Pogue (p. 84) has not had the opportunity of examining the alleged turquois beads found at certain neolithic stations of France and Spain. It would be interesting to see this vexed problem solved, as on the one hand we have the theory of Aveneau de la Grancière (*Les parures préhistoriques et antiques en grains d'enfilage et les colliers talismans cello-armoricains*, p. 147) that these stones were imported from the Orient in a crude state, and on the other hand the opinion of Comte de Limur that this material was brought to light from the tin mines of Montbras. A single analysis made by Damour in 1864 demonstrates that the stones in question more nearly approximate variscite; he also bestowed on it the name *callais*. As no analysis on a large scale has as yet been conducted, the evidence remains inconclusive. O. Montelius (*Chronologie der ältesten Bronzezeit*, p. 204) seems to incline toward the belief that all these beads, also those found in Spain and Portugal, are real turquois.

The author asserts that the Nile was named in reference to its blue waters from the Sanskrit word *nīla*, meaning blue (p. 110). Latin *Nilus* is the reproduction of Greek *Neilos* which either goes back to an Egyptian word, or whose origin must be regarded as obscure, but which cannot be sought for in Sanskrit. By the way it may be remarked that the development of color-sense cannot be traced from linguistic arguments, and that Geiger's study cited by Pogue (p. 68) is thoroughly antiquated, nor

is it true that Chinese lacks words for blue. Defects of color nomenclature are merely defects or limitations of language, not of color-sense.

To the bibliography may be added Robert de Berquen, *Les merveilles des Indes orientales et occidentales ou Nouveau traité des pierres précieuses et perles*, pp. 51-53 (Paris, 1669); and H. H. Hayden in *Memoirs Geological Survey of India*, vol. 36, pt. 2, 1907, p. 65 (brief reference to turquois at Lhasa).

The preceding observations bear only on some details of Dr. Pogue's monograph, and most assuredly do not detract from the intrinsic value of his magnificent work. My own limitations prevent me from rendering it full justice. It will remain a classic in the hands of all students interested in mineralogy, ethnology, and archeology, and occupy a place of honor in the publications of the National Academy. It is a cyclopedia giving an intelligent summary of all we know at present about the turquois. The attention of Americanists may be specially called to the interesting chapter on the chalchihuitl question. The illustrations are well selected, and the reproductions are excellent.

B. LAUFER

SOME NEW PUBLICATIONS

De Booy, Theodoor. Notes on the Archeology of Margarita Island, Venezuela. (Contributions from the Museum of the American Indian, Heye Foundation, vol. II, no. 5.) New York, 1916. Pp. 28, 8 pls., 15 figs.

Eaton, George F. The Collection of Osteological Material from Machu Picchu. (Memoirs of the Connecticut Academy of Arts and Sciences, vol. v.) New Haven, Connecticut, 1916. Pp. 96, 39 pls., 50 text figs., 2 tables, 1 survey map.

Emmons, George T. The Whale House of the Chilkat. (Anthropological Papers of the American Museum of Natural History, vol. XIX, part I, pp. 1-33, 4 pls., 6 text figs.) New York, 1916.

Gregory, William K. Studies on the Evolution of the Primates. (Bulletin of the American Museum of Natural History, vol. XXXV, art. XIX, pp. 239-355, 1 plate, 37 figs.)

Harrington, John Peabody. The Ethnogeography of the Tewa Indians. (Bureau of American Ethnology, Twenty-ninth Annual Report, pp. 29-636, pls. 1-21, maps 1-29, 29A, 30, diagram 1.) Washington, 1916.

Haeberlin, H. K. The Idea of Fertilization in the Culture of the Pueblo Indians. (Memoirs of the American Anthropological Association, vol. III, no. 1, Jan.-Mar. 1916.) Pp. 55.

Hawkes, E. W. and Linton, Ralph. A Pre-Lenape Site in New Jersey. (University of Pennsylvania, The University Museum, Anthropological Publications, vol. VI, no. 3.) Philadelphia, 1916. Pp. 43-77.

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Saville, Marshall H. Monolithic Axes and their Distribution in Ancient America. (Contributions from the Museum of the American Indian, Heye Foundation, vol. II, no. 6.) New York, 1916. Pp. 13, 6 pls., 1 fig.

Stevenson, Matilda Coxe. Ethnobotany of the Zuni Indians. (Bureau of American Ethnology, Thirtieth Annual Report, pp. 31-102, pls. 1-3.) Washington, 1915.

Wissler, Clark. General Discussion of Shamanistic and Dancing Societies. (Anthropological Papers of the American Museum of Natural History, vol. XI, part XII, pp. 853-876.) New York, 1916.

DISCUSSION AND CORRESPONDENCE

PERCY GRAINGER AND PRIMITIVE MUSIC

I HAVE often thought that one of the surest tests of a true musical instinct is the ability to sense melody and rhythm in the music of primitive peoples. The frequent presence of such disturbing elements as unfamiliar intonations, a too forceful handling of the voice, loud and monotonous drum or rattle accompaniments, and interspersed whoops prevent many a supposed lover of music, many an individual blessed with all the endowments of "musicianship" from perceiving the pure gold that lies buried only a little below the surface. In the measure that spontaneous esthetic appreciation is independent of the bias determined by the conventional garb of art must such appreciation be deemed sincere and sound. Thousands of "art lovers" accept without question second and third rate productions, provided they be dressed in the usual accoutrements of art, who would shrink from a masterpiece treated in a totally different style. Hence it is not, as a rule, the musical amateur, learned or unlearned, who is the most ready to acknowledge the profoundly musical quality of much of the music of primitive folk, but rather the musical creator, the composer, whose musical learning does not sit so heavily on him as to crush his instinctive appreciation of the beautiful wherever and however it may be found. The case in music is precisely analogous to that in primitive plastic art. The layman who talks glibly of Rembrandts and Dürers would fain have us believe his soul is being constantly bathed in art, yet he finds some exquisite bit of West Coast Indian art merely "interesting" (generally a pretentious way of saying "funny") where the genuine artist frankly says "beautiful" or "great."

And so we need not be surprised to find a Debussy rejoicing in the exotic fragrance of Javanese music or, to come nearer home, a MacDowell or Cadman finding frank inspiration in the tunes of the American Indian. There is, however, a gap between such esthetic appreciation and the laborious field and laboratory study of primitive music undertaken by the musical ethnologist. The interest of a MacDowell and of a von Hornbostel do not readily or, at any rate, frequently combine. Hence my keen gratification at coming across an example of this potentially rare bird only recently, in looking through the July, 1915, number (vol. 1, no. 3) of *The Musical Quarterly* (published by G. Schirmer, New York

and London). The purpose of this note is to call the attention of ethnologists who are interested in primitive music to a paper by the Australian composer Percy Grainger on "The Impress of Personality in Unwritten Music" (pp. 416-435). Grainger is well known in the musical world both as pianist and as orchestral composer; he is particularly noteworthy for his daring and extensive use in his orchestral scores of such unusual instruments as the guitar and xylophone. In the article referred to Grainger shows himself to be not merely a cultivated musician who is half-condescendingly disposed to take from the storehouse of folk and primitive music a hint or two for his own purposes but, on the contrary, an enthusiastic and painstaking collector of such music who freely acknowledges the complexity of the problem, and is convinced of the necessity of studying with all seriousness the subtleties of intonation and rhythm which such music presents. Grainger's ideal falls nowise short of that of the scientific ethnologist. And his sympathetic understanding of the primitive background again creates a common bond with the professed student of primitive culture. I shall be content, for the rest, to let Grainger speak for himself, so as to give the reader of the *American Anthropologist* some idea of how a topic near to him strikes one of the foremost of English-speaking composers.

Symptomatic of the general attitude of the musical routinist towards the objective study of all music but that of the academy is the following (p. 433):

Experience of primitive music is not in any way thrust upon the budding musician. When I was a boy in Frankfort my teacher wanted me to enter for (I think it was) the Mendelssohn Prize for piano playing, and I remember asking him: "If I should win, would they let me study Chinese music in China with the money?" And his reply: "No, they don't give prizes to idiots."

The most enthusiastic interpreter of primitive life could hardly do greater justice than Grainger to the superior possibility of individual participation in art among primitive communities than in our own. He says (p. 418):

With regard to music, our modern Western civilization produces, broadly speaking, two main types of educated men. On the one hand the professional musician or leisured amateur-enthusiast who spends the bulk of his waking hours making music, and on the other hand all those many millions of men and women whose lives are far too overworked and arduous, or too completely immersed in the ambitions and labyrinths of our material civilization, to be able to devote any reasonable proportion of their time to music or artistic expression of any kind at all. How different from either of these types is the bulk of uneducated and

"uncivilized" humanity of every race and color, with whom natural musical expression may be said to be a universal, highly prized habit that seldom, if ever, degenerates into the drudgery of a mere means of livelihood. . . . Now primitive modes of living, however terrible some of them may appear to some educated and refined people, are seldom so barren of "mental leisure" as the bulk of our civilized careers.

Of the complexity of "unwritten" music and of the incapacity of the general public, through sheer ignorance, to fathom and enjoy this complexity, Grainger remarks (p. 417):

While so many of the greatest musical geniuses listen spellbound to the unconscious, effortless musical utterances of primitive man, the general educated public, on the other hand, though willing enough to applaud adaptations of folk songs by popular composers, shows little or no appreciation of such art in its unembellished original state, when, indeed, it generally is far too complex (as regards rhythm, dynamics, and scales) to appeal to listeners whose ears have not been subjected to the ultra-refining influence of close association with the subtle developments of our latest Western art-music. . . . As a rule folk-music finds its way to the hearts of the general public and of the less erudite musicians only after it has been "simplified" (generally in the process of notation by well-meaning collectors ignorant of those more ornate subtleties of our notation alone fitted for the task) out of all resemblance to its original self.

The following is of interest to the folk-psychologist, though personally I am inclined to believe that Grainger may go too far in his generalization (p. 423):

The whole art [of folk and primitive music] is in a constant state of flux; new details being continually added while old ones are abandoned. These general conditions prevail wherever unwritten music is found, and though I may never have heard Greenland or Red Indian music I feel pretty confident that as long as it is not too strongly influenced by the written music of our Western civilization it will evince on inspection much the same general symptoms as those displayed by the folk-music of British, Russian or Scandinavian peasants, or by natives of the South Seas, and we may always be sure that the singing of (let us say) an unsophisticated Lincolnshire agriculturalist of the old school will in essentials approximate more closely to that of Hottentots or other savages than it will to the art-music of an educated member of his own race living in a neighboring town.

My own experience would lead me rather to emphasize the quite definite stylistic peculiarities of the folk-music of different tribes and peoples. However, much depends on the perspective adopted. The measuring rod of the musician must needs be differently graduated from that of the ethnologist.

For the following breath of fresh air let us be duly thankful (pp. 427-430):

What life is to the writer, and nature to the painter, unwritten music is to many a composer: a kind of mirror of genuineness and naturalness. Through it alone can we come to know something of the incalculable variety of man's instincts for musical expression. From it alone can we glean some insight into what suggests itself as being "vocal" to natural singers whose technique has never been exposed to the influence of arbitrary "methods." In the reiterated physical actions of marching, rowing, reaping, dancing, cradle-rocking, etc., that called its work-songs, dance-music, ballads and lullabies into life, we see before our very eyes the origin of the regular rhythms of our art-music and of poetic meters, and are also able to note how quickly these once so rigid rhythms give place to rich and wayward irregularities of every kind as soon as these bodily movements and gestures are abandoned and the music which originally existed but as an accompaniment to them continues independently as art for art's sake. In such examples as the Polynesian part-songs we can trace the early promptings of polyphony and the habits of concerted improvisation to their very source, and, since all composing is little else than "frozen inspiration," surely this latter experience is of supreme importance; the more so, if there again should dawn an age in which the bulk of civilized men and women will come to again possess sufficient mental leisure in their lives to enable them to devote themselves to artistic pleasures on so large a scale as do the members of uncivilized communities.

Then the spectacle of one composer producing music for thousands of musical drones (totally uncreative themselves and hence comparatively out of touch with the whole phenomenon of artistic creation) will no longer seem normal or desirable, and then the present gulf between the mentality of composers and performers will be bridged.

The fact that art-music has been written down instead of improvised has divided musical creators and executants into two quite separate classes; the former autocratic and the latter comparatively slavish. It has grown to be an important part of the office of the modern composer to leave as few loopholes as possible in his works for the idiosyncrasies of the performer. The considerable increase of exactness in our modes of notation and tempo and expression marks has all been directed toward this end, and though the state of things obtaining among trained musicians for several centuries has been productive of isolated geniuses of an exceptional greatness unthinkable under primitive conditions, it seems to me that it has done so at the expense of the artistry of millions of performers, and to the destruction of natural sympathy and understanding between them and the creative giants.

Perhaps it would not be amiss to examine the possible reason for the ancient tendency of cultured musicians gradually to discontinue improvisation, and seek some explanation for the lack of variety with regard to scales, rhythms and dynamics displayed by our western art-music when compared with the resources of

more primitive men in these directions. I believe the birth of harmony in Europe to have been accountable for much; and truly, the acquisition of this most transcendental and soul-reaching of all our means of musical expression has been worth any and every sacrifice. We know how few combinations of intervals sounded euphonious to the pioneers of harmonic consciousness, and can imagine what concentration they must have brought to bear upon accuracies of notation and reliability of matters of pitch in ensemble; possibly to the exclusion of any very vital interest in individualistic traits in performances or in the more subtle possibilities of dynamics, color and irregular rhythms.

With the gradual growth of the all-engrossing chord-sense the power of deep emotional expression through the medium of an unaccompanied single melodic line would likewise tend to atrophy; which perhaps explains why many of those conversant with the strictly solo performances of some branches of unwritten music miss in the melodic invention of the greatest classical geniuses—passionately as they may adore their masterliness in other directions—the presence of a certain satisfying completeness (from the standpoint of pure line) that may often be noticed in the humblest folk-song.

It always seems to me strange that modern composers, with the examples of Bach's Chaconne and Violin and 'Cello Sonatas as well as of much primitive music before them, do not more often feel tempted to express themselves extensively in single line or unison without harmonic accompaniment of any kind. I have found this a particularly delightful and inspiring medium to work in, and very refreshing after much preoccupation with richly polyphonic styles. Now that we have grown so skilful in our treatment of harmony that this side of our art often tends to outweigh all our other creative accomplishments, some of us feel the need of replenishing our somewhat impoverished resources of melody, rhythm and color, and accordingly turn, and seldom in vain, for inspiration and guidance to those untutored branches of our art that have never ceased to place their chief reliance in these elements. I have already referred to the possibilities of "inexact unison" evinced by Maori and Egyptian music. Similar rich and varied lessons might be learned from Red Indian, East Indian, Javanese, Burmese, and many other Far Eastern musics.

Being, moreover, the fortunate heirs to the results of those centuries of harmonic experiments in which ever more and more discordant combinations of intervals came to be regarded as concordant, we are now at last in a position from which we can approach such music as the Rarotongan part-songs and similar music of a highly complex discordant nature with that broad-minded toleration and enthusiastic appreciation which our painters and writers brought to bear on the arts of non-Europeans so many generations before our musicians could boast of an equally humble, cultured and detached attitude.

A broad-minded tolerance and an enthusiasm for the esthetic value of all that is genuine and distinctive in art, whether or not countenanced by academic sanction, are here united with a sure sense of history that, on the whole, seems rather uncommon among creative musicians.

I cannot close this already lengthy note without quoting from the last pages of the paper (pp. 433-434):

I believe the time will soon be ripe for the formation of a world-wide International Musical Society for the purpose of making all the world's music known to all the world by means of imported performances, phonograph and gramophone records and adequate notations. Quite small but representative troupes of peasant and native musicians, dancers, etc., could be set in motion on "world tours" to perform in the subscription concerts of such a society in the art-centers of all lands. One program might consist of Norwegian fiddling, pipe-playing, cattle-calls, peasant dances and ballad singing, another of various types of African drumming, marimba and zanze playing, choral songs and war dances, and yet another evening filled out with the teeming varieties of modes of singing and playing upon plucked string instruments indigenous to British India; and so on, until music lovers everywhere could form some accurate conception of the as yet but dimly guessed multitudinous beauties of the world's contemporaneous total output of music.

Quite apart from the pleasure and veneration such exotic arts inspire purely for their own sake, those of us who are genuinely convinced that many of the greatest modern composers . . . owe much of their contact with one kind or other of unwritten music, must, if we wish to behave with any generosity toward the future, face the fact that coming generations will not enjoy a first-hand experience of primitive music such as those amongst us can still obtain who are gifted with means, leisure or fighting enthusiasm. Let us therefore not neglect to provide composers and students to come with the best *second-hand* material we can. Fortunes might be spent, and well spent, in having good gramophone and phonograph records taken of music from everywhere, and in having the contents of these records noted down by brilliant yet painstaking musicians; men capable of responding to unexpected novelties and eager to seize upon and preserve *in their full strangeness and otherness* just those elements that have least in common with our own music. We see on all hands the victorious on-march of our ruthless western civilization (so destructively intolerant in its colonial phase) and the distressing spectacle of the gentle but complex native arts wilting before its irresistible simplicity.

Grainger's enthusiastic proposal doubtless meets with little more than a humorous smile from the average musician. To the ethnologist it opens up a vista full of interest and profit. E. SAPIR

GEOLOGICAL SURVEY,
OTTAWA, CANADA.

REMOVING THE SKINS OF ANIMALS BY INFLATION

IN the summer of 1911 my Micmac informant described a method of removing the skins of animals which seemed to me novel, and, at the time, highly dubious. He stated that a small opening was made in the skin

near the foot of the animal, a tube inserted and air blown in until the skin had been separated from the flesh. This separation, in the case of a moose, would extend as far as the thigh of the animal. The tube used consisted of three quills of wild goose feather, telescoped one into the other. He said he had seen Frenchmen from a man-of-war skinning sheep in this manner but that it had been learned by the French from the Indians and not *vice versa*.

A Malecite to whom I repeated this information said at once that it was unreliable—a moose's skin was too tough to be removed in this way; the method applied only to rabbits. He stated that inflation was commonly employed by the Malecite when removing the skins of rabbits. A few weeks later I mentioned this custom in the presence of two other Indians, one a Penobscot, the other a Malecite. The Penobscot youth laughed, saying my informant had been playing upon my credulity. His older companion remarked that in his boyhood days he had gotten many a punishment for removing the skins of animals in this way. His grandmother had punished him because she said this treatment was an insult to the animal. Other Malecite informants corroborated him. There thus seems little doubt that the Malecite practised inflation in removing the skin of rabbits, and the administration of punishment suggests that it is at least comparatively recent, if not exotic.

As these tribes of the Canadian Maritime Provinces have been considerably influenced by the French, the origin of the custom would naturally be attributed to them. It was used in England a century ago in experimental laboratory work with animals, especially frogs, and for the very reason that the Indians alleged, namely, to prevent injury either to the skin or to the flesh. So far as I can learn it was in England independently invented to serve the laboratory need.

Of its use in France I have not been able to find any record except an admission of its existence contained in the *Dictionnaire Bescherelle diné en 4 vols.*, Paris 1562, where the reason given is the separation of the skin *plus aisément*, and without danger of injury. It specifies sheep as the animals upon which the inflation method was practised.¹

In Spanish countries also the method of inflation was practised. My friend, Prof. B. F. Schappelle, when in Barcelona three years ago, learned of the practice of inflation in the abattoirs of that city and furnished me with a photograph of the equipment and process. It is there done by machinery, using compressed air forced by pumps. Here, too, it is practised upon sheep, the reason given being that it does not injure

¹ Information furnished by C. M. Barbeau.

the skin or the flesh of the animal. The insertion is made near the foot of the animal. About its more extensive or earlier use in Spain I have not been able to procure any information.

If, however, the custom existed in Spain in earlier days one would expect to find it not only there but in the Spanish colonies as well. I have found evidence of the existence of the custom in one of the older Spanish possessions, that of Porto Rico. In a letter dated May 2, 1916 at Bayamon, Porto Rico, Mr. Robert L. Junghaus writes as follows:

Here, in Porto Rico, the inflation method has been in use since time immemorial, but is now gradually going out of use on account of the changes in customs, and the opposition of the Health Department.

In Porto Rico the only animals that were skinned by inflation, as far as I know, were goats, cats, rabbits, and less frequently, horses. The goat is, however, the animal that is most frequently skinned by inflation. Formerly it was almost exclusively so skinned. Sheep, where kept, are also skinned by inflation.

In Porto Rico the inflation method is used in preference to skinning by knife, because in the animals that do not habitually have deposits of adipose tissue between the skin and the flesh, but considerable connective tissue, the skins are removed cleaner and sounder, not being thinned or cut by the knife. The skinning is done more rapidly, and as no meat adheres to the skins, they dry more quickly and are ready as soon as they are dry, to be put to use without further dressing. When the flesh is used for food, the inflation method has the further advantage that absolutely no hair sticks to the meat.

The method of removing the skins consists in making incisions in the "wrists" or so-called knees or elbows, and inserting in the incision a tube, through which the air is blown. As the skin separates from the flesh and becomes inflated, the air is worked along by kneading, pushing and pounding, so as to separate the skin from the flesh, without necessity of an undue amount of blowing. Of course the air under the skin is augmented from time to time, as it is deemed necessary. The blowing is usually done with the mouth, but some semi-professional skimmers used homemade hand bellows. When the inflation is done with the mouth, the tube used is usually any vegetable tube that may be handy, such as an internode or petiole of the squash, of the castor plant, a hollow reed, a piece of bamboo, etc. The Insular Health officers are opposed to the inflation method because of the contamination of the meat by the breath of the person who does the inflation.

One person does both the blowing and the manipulation of the skin.

The skins of goats are used in Porto Rico untanned, to form the seats and backs of a crude semi-reclining chair, used by the country people, called a *Ture*; also for the bottoms of swinging hammock cribs, called a *Coy*. Ordinary cribs also sometimes have their bottoms made of a goat skin. The most frequent use of the goat skins is, however, to place under infants, with or without a sheet over it. These skins are known as *Salea*, and are so used to prevent the urine wetting the bed, crib or floor, as the case may be.

Whatever the use to which the skins are put, the hair is always upwards, *i. e.*, on the side of use.

In Porto Rico the skins are not left unopened, as they were never used here as receptacles for liquids or grain, as is the custom in Spain, Northern Africa, and the Near East.

Spaniards have told me that in Spain the skins of goats and sheep are removed by inflation, when they are to be used as sacs for the storage of wine or grain, in the same way as here in Porto Rico.

Neither in Porto Rico, nor in Spain, are the skins of cattle removed by inflation but in Cataluña the skins of cattle are often pulled off, from the neck backwards, instead of being cut off, as elsewhere.

In Asturias and Castilla, the skins of sheep and goats are used as storage sacs for flour and grain, and are known as *Fuelles*. For *fuelles* the wool or hair is sometimes cut back, but it is usually removed in a tanning process, which consists in the immersion of the skin in a pickle of corn meal, wood ashes and brine. For *fuelles* the neck opening alone is left for the filling and emptying of the sac, the other openings being tied or sewn up. These *fuelles* are most extensively used in Asturias and Castilla, but are now gradually going out of use.

In Asturias, Galicia and Castilla, the skins of sheep or goats, with the hair or wool removed, were formerly used as receptacles for the carrying of milk, and as churns to make butter. When used as churns, the skins partially filled with the cream, are inflated, and then closed. They are then taken in the two arms of the butter maker and swung sideways, just like an infant, until the butter comes. These skins for milk, are known as *Zurróns*.¹

In the whole of Spain, however, by far the most common use of skins, removed by inflation, is as containers for wine, called *Pellejos*. For these goat skins are used, the hair being left on, the longest hair, on neck, shoulder, and back only, being cut back a little. The skins are turned hair side inward, and the inside of the sac is then coated with a rosin-pitch preparation. All openings are tied or sewn up, with the exception of one of the legs, which is left for filling or emptying the *pellejo*. Whenever the *pellejo* is torn, repairs are made by putting into the opening a grooved wooden stopper, about which the edges of the tear are drawn and tied. The advantages of the *pellejos* over barrels is claimed to consist in their greater economy, and the ease with which they are handled, stored, and transported from place to place. Mature male goat skins frequently attain very large dimensions, sometimes holding as much as 12 *arrobas* of wine, an *arroba* being about 12½ *litros* of 2 *cuartillos* each, each *cuartillo* weighing 1 *libra*; hence an *arroba* of wine is equal to 25 Spanish pounds. But the exact weight and measure differs considerably from district to district. The wine in *pellejos* is bought and sold by weight. The standard of weight for wine is the *arroba*.

Pellejos for wine or olive oil are also called *Odres*. Very small *pellejos*, of

¹ I have seen the same method employed by the fellahin south of Cairo, near Beba. Here the skin vessel churn was usually suspended from the roof of the hut and thrust to and fro by the churning until the butter came. (Note by W. D. W.)

globular form and with wooden stoppers, used to carry wine by hand on journeys, are called *botas*. Larger skins, also used for journeys, especially by teamsters, are called, *cabritas*, and hold from 1 to 2 *arrobas*. The regulation *pellejo* runs from 6 to 10 *arrobas* in weight.

As to the use of skins as containers for water, wine, oil and as floats, in Africa and the Near East, you surely know more than I. Skins are frequently depicted on Assyrian and Egyptian bas-reliefs and paintings. I have an idea of having seen the operation of skinning by inflation and the subsequent preparation of the skins as containers, somewhere depicted in an Egyptian bas-relief, but cannot recall where.¹

It is very probable that the inflation method was used in many parts of Spanish America, but so far I have been able to learn of its practice in only two other regions. Dr. J. Alden Mason was informed of its prior practice in Monterey county, California, where it was said to have been used on sheep and to have been borrowed from the Spanish Missions, though it seems no longer to be used in that locality. Mr. Celso Espinosa writes me that it was in use in New Mexico, though not generally. He writes under date of August 13, 1916,

Personally I witnessed this practice on several occasions some thirty years ago, in southwestern Colorado although by New Mexicans. The animal was killed, incisions were made in the lower part of the legs and it was then inflated by blowing with the mouth. The operation was finished with a knife. The method is a very speedy and efficient one, and beyond doubt was prevalent both in New Mexico and Colorado, although for some reason it seems to have been discontinued in later years.

W. D. WALLIS.

FRESNO, CALIFORNIA.

DOUBLE COILING

WHILE examining the collection of San Carlos Apache baskets in the American Museum of Natural History recently, what is supposed to be a veritable freak was brought to light, a double coiled basket.

In the accompanying photograph the junction of the two coils may be seen about one half inch to the right of the finishing point of the basket.

The idea of the double coil being so "unthinkable" in the realm of coiled baskets, according to previous experience, it was some minutes before the cause for the junction was discovered.

The statement that the basket was made by sewing (or carrying along) two coils at a time was received rather incredulously, but such was actually the case. The starting point for the double coil may be seen in the last row of the black and white checker work completing the bottom,

¹ Prof. W. Max Müller believes there is no evidence of the practice of inflation in ancient Egypt.

at the foot of the first human figure to the left from the bottom. If either one of these coils be traced around the basket it will come out two rows above the starting point, showing that two coils were carried at one time. These were not sewed with a figure eight stitch, as was suggested, but in



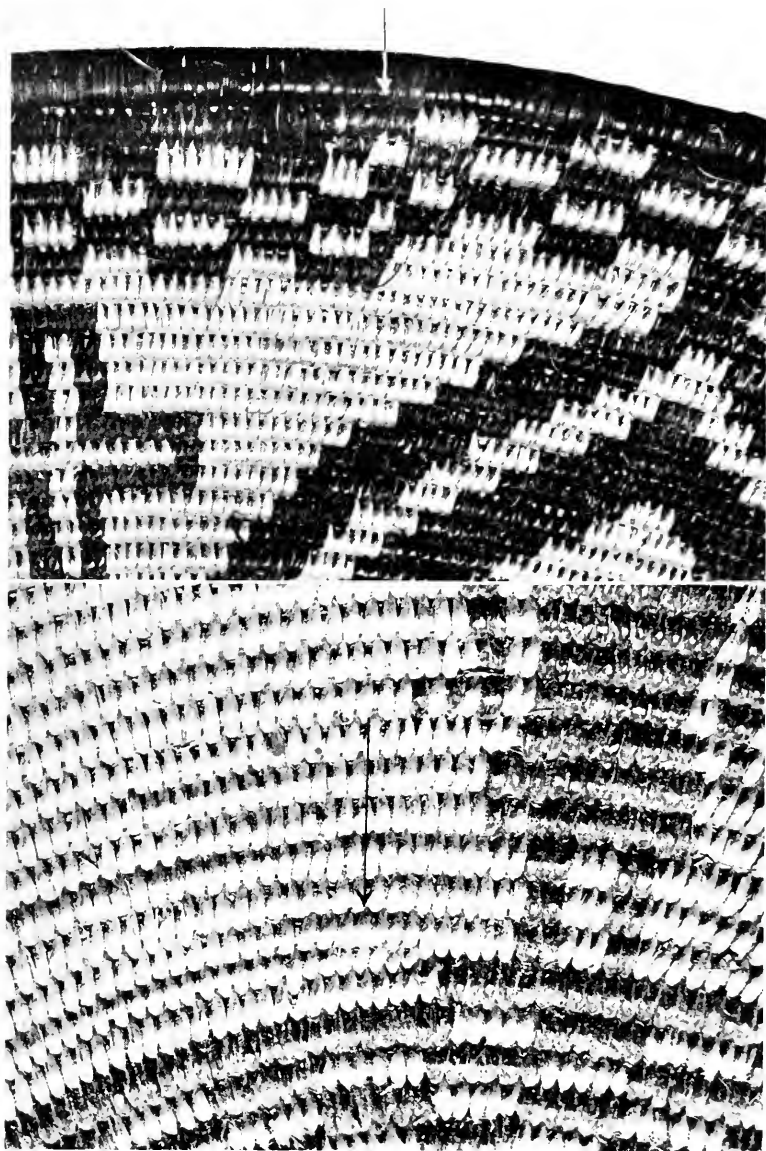
FIG. 78.—Apache basket. (50-9035 A.M.N.H.)

the regular manner and probably with a few stitches at a time, first on the lower, then on the upper coil.

From a standpoint of design, the basket is complicated enough, as San Carlos work goes, and beautifully executed, in fact, above the average, but the double coil is the unique feature according to authorities at the Museum, and so far, no explanation has been forthcoming as to the reason for such a method of procedure, unless it is, as Dr. Boas is wont to say, a beautiful example of virtuosity, that is, of playing with the technique.

HELEN H. ROBERTS

NEW YORK CITY.



DOUBLE COILED BASKET

LOWER, BEGINNING OF DOUBLE COIL: UPPER, ENDING OF DOUBLE COIL

DISCOVERY OF NEW MATERIALS OF THE MOSETEN IDIOM

Among the valuable collection of Spanish original manuscripts acquired by Dr. Walter Lichtenstein, the Librarian of Northwestern University, at Evanston, Ill., during his trip around South America, in 1913-1914, and which are now preserved in the said library, there is a large and as yet unpublished tract written by an Italian Franciscan missionary on the language of the Mosen Indians of northeastern Bolivia. This most important manuscript was discovered by the writer, who is at the present engaged in classifying the manuscripts. The author belonged to the *Colegio de Propaganda Fide* in Bolivia, and was *cura-párroco* of the Mission called *Imaculada Concepción de Covendo*. The manuscript contains a Spanish-Mosen vocabulary, of about two thousand five hundred words, which is, of course, a most remarkable feature. A short grammatical dissertation follows; then phrases in both languages, a *panegirico* in Mosen solely, the *curriculum vitae* of the missionary and so forth.

At the close, it bears the date of May 20, 1868. It is clearly written, and is, undoubtedly, the autograph.

The Mosen language is one of the less known Indian languages of Bolivia. The first tract on this interesting idiom seems to have been published by the Franciscan missionary Father Andrés Herrero, at Rome, 1833. Further contributions appeared in several scientific magazines at Buenos Aires. The editor of those tracts is the well-known South Americanist Dr. Samuel Lafone Quevedo, at the present time Director of the *Museo de la Plata*. He used, I believe, manuscripts of certain modern Franciscan missionaries, who are or were laboring among those Indians. As to the linguistic affiliation of the Mosen, as well as to that of the Tacana Indians, though the latter seem to be closely related to the former, we ought to confess: "Ignoramus." All those idioms of central, northern, and eastern Bolivia have not yet been studied systematically and methodically. Uhle, the great authority of Peruvian and Bolivian matters, once suggested relationship between the Maropa and the Puquina. Whether the latter are identical with the Uros, as asserted by Toribio Polo, is still an open question. The fact is that the Puquina spoken of by Uhle (and Barcena) is quite different from the one studied by the untrustworthy French author Raoul de la Grasserie.

The so-called "Guariza," a name which Brinton borrowed from Teza's *Saggi Inediti di Lingue Americane*, where we find inserted a *Pater Noster*, *Ave Maria* and the *Credo*, that idiom is nothing but a Tacana

dialect. It is one of the many typographical blunders in the *Saggi*. "Guarayo," or "Guaraya" is a collective name, and is applied indiscriminately to Indians of the Páno linguistic family, as well as to the Tacana-Moseten and others. In early documents of the sixteenth century we read of the Guarayos-Caribes, who were living along the upper course of the river Madre de Dios. The Guarayos described by Erland Nordenskiöld are, no doubt, Carib-aruáque. Thus such names, as for instance, "Guarayos," have to be used with much of care. They are misleading and suggestive of confusion, which is already great enough in our young discipline.

The Moseten material will, I hope, be published within the next few months at the expense of Northwestern University.

RUDOLPH SCHULLER

CHICAGO, ILLINOIS.

PROCEEDINGS OF THE ANTHROPOLOGICAL SOCIETY OF WASHINGTON

Meeting of March 7, 1916

At the 496th meeting, held March 7, Dr. C. L. G. Anderson read a paper on "Old Panama." After reviewing the voyage of Columbus along the coast and incidents of the early history of the Isthmus, and especially the settlement of Balboa, Pizarro, and others on the Gulf of Darien in 1510, he spoke particularly of early accounts of the aborigines. West of the colony of Darien came the Indian province of Cueva, and west of that, the province of Coiba, which ended at Limon Bay and the Chagres River. Darien or Cueva is a better name than Cuna for the Indians commonly known as San Blas, Mandingas, etc. These, of course, do not include the Chocos of Colombia. The natives of Urabá, east of the Gulf of Darien, were always called Caribes; they fought with bows and poisoned arrows. The Dariens, at the time of the conquest, did not poison their weapons or make war with bows and arrows, but with wooden swords, long lances, and javelins hurled by the use of throwing sticks. Unlike the Mexicans and Peruvians they had no belief as to the coming of a white Messiah, and fought the Spaniards from the start.

Oviedo mentions the following among the tongues between Urabá and Cape Gracias a Dios: Cueva, Coyba, Burica, Lengua de Paris, Lengua de Veragua, Chondales, Nicaragua, Chorotegas, Oroci, Orotiña, Guëtares, and Maribios.

There were four kinds of houses: (1) quadrangular, (2) circular, (3) communal dwellings similar to those among the San Blas today, and (4) dwellings in the tops of trees. The first whites exaggerated the nudity of the natives, for pages are devoted to describing their clothing. They possessed both ordinary and ceremonial garments. Females wore a short skirt and often added a shirt. Chiefs wore long white robes on ceremonial occasions. The tribes believed in a supreme being and worshipped the sun, moon, and many spirits. They had medicine-men and priests who told the people what they should do. Puberty was attended by ceremonies. There was much drinking of chicha at weddings and a house was built for the young man by his friends. After confinement a woman bathed herself and babe in the river and the newborn was fumigated with tobacco. When not warring, the bands bartered dry fish,

sea salt, shells, pottery, etc., among themselves. Slaves were branded or had a particular tooth pulled out. Graves were covered level with the ground, although the Chibchas constructed burial mounds. Chiefs were desiccated over a slow fire. All undertakings began with drink, singing, and dancing.

The best recent description of the Chocos is by Dr. H. Pittier. There is much discussion over the classification of the Indians of western Panama. A memorial of 1606 A.D. mentions among the tongues in Chiriqui Province those of the Cothos, Vorisques, Dorasques, Utelaes, Bugabaes, Zunes, and others. The Bureau of Ethnology was urged to study the Isthmian tribes before their primitive customs are lost.

Dr. Pittier said, in discussing the paper, that it had been determined that Columbus was at Limon; also that the blowpipe as well as the bow and arrow was used by certain tribes of the region. Dr. Anderson agreed that Panama Indians used the bow and arrow to some extent, but not in fighting. Following Dr. Pittier's statement concerning slaves further north, Dr. Swanton pointed out that there was no true slavery in North America north of Mexico, excepting on the West Coast. The so-called slaves of the Pawnees or the Green Bay tribes mentioned by others in the discussion were probably war captives. They were not really slaves because their children were not slaves.

Meeting of March 21, 1916

At the 497th meeting, held March 21, Miss Frances Densmore, of the Bureau of Ethnology, addressed the Society on "Mandan Music," with lantern and vocal illustrations. The songs and legends presented by the speaker were collected among the Mandan Indians on the Fort Berthold Reservation, in North Dakota during two visits to that reservation, the first in 1912 and the second in 1915.

A few facts concerning the history of the tribe were given by way of introduction. The Mandan are of Siouan stock and first appear on the page of history in 1738. About 10 years later they are said to have been living near the mouth of the Heart River, in North Dakota, and remains of their villages at that point were found by Lewis and Clark in 1804. An epidemic of smallpox almost obliterated the tribe in 1837, the number of survivors being estimated at about 125. Lewis and Clark give the number of Mandan previous to this epidemic as 1600. Since that time the tribe has increased and the report of the Indian Office for 1914 gives the number of full-blood Mandan as 220. Some of these are sturdy old people who have kept their tribal traditions, and from such men and

women the material comprised in this paper was collected. To the minds of the Mandan their country was peopled with spirit beings who lived in the trees and the buttes. From the spirit women who lived in a butte called Eagle Nose Butte, about 30 miles south of the present site of Bismarck, they say that they received a society called the Creek Women Society, with its ceremonial songs. Some details concerning this society were given by the speaker, who also outlined the legend of the Terrible Snake who lived in Thunder Butte.

After describing briefly the life in the old Mandan village the speaker passed to the principal subject of the paper, which was the custom of eagle catching. The tradition of the origin of this custom, as well as of the wolverine fetish owned by every leader of the eagle catchers, had been secured from the last Mandan who owns such a fetish and has the inherited right to sing the songs connected with it. These songs comprised those taught to the first eagle catcher by a wolverine, and include songs given to the wolverine by the buffalo, black eagle, coyote, and snake; as well as songs to be sung when the eagle trap was constructed and the bait was prepared, the cord for securing the eagle was made ready, and the sweat lodge was built in the eagle camp. Other songs were connected with eagle catching, which was an undertaking having a deep significance and a somewhat ceremonial character. Several of these songs were sung by the speaker, who also gave a song said to have been learned from the Moon. A song connected with the legend of the origin of the flute was given in connection with the narrative.

Charts were presented showing a comparison of Chippewa, Sioux, and Mandan songs, as studied by the speaker. In these diagrams were included certain songs of the Hidatsa, who for many years have lived in the same villages with the Mandan, and other songs which cannot be accredited with exactness to either tribe. The musical material obtained on this reservation is therefore considered as Mandan-Hidatsa, when placed in comparison with that of other tribes. Comparison of tonality with Chippewa and Sioux shows the Mandan to contain a larger percentage of major songs than either of these tribes, the percentages of major songs being 57 among the Chippewa, 40 among the Sioux, and 65 among the Mandan-Hidatsa. Comparison of structure showed the percentage of harmonic songs (those whose contiguous accented tones bear a simple chord-relation to each other) to be 24 per cent among the Chippewa, 12 per cent among the Sioux, and 35 per cent among the Mandan-Hidatsa. These comparisons are based upon the analysis of 70 Mandan-Hidatsa songs, while the number of Chippewa and Sioux is

much larger. Further investigation may somewhat change the results of the comparative analysis.

The paper was illustrated throughout by lantern slides, and was followed by two musical numbers under the direction of Mr. Heinrich Hammer, showing the adaptation of Indian themes in musical composition. One of these was a fantasie for violin and piano, composed by Mr. Hammer on a theme collected by Miss Densmore and presented for the first time on this occasion.

Meeting of April 4, 1916

At the 298th meeting, held April 4, Miss Adela C. Breton, Fellow of the Royal Anthropological Institute, read a paper on "Australasian Museums and Their Work." The natives are becoming absorbed into the white community and in many places are semicivilized and losing their former crafts. Nowhere except in the museums can the ethnologist get a thorough understanding of what they accomplished. The Australian Museum at Sydney has immense series of all Australian weapons, arboglyphs, etc., and a magnificent New Guinea collection, including pottery, bone daggers, and, among American things, Arkansas pottery, Peruvian figure pots, throwing sticks, and Yucatan celts with lance heads and shell beads (received from A. Bastian). The bone daggers are like those in the ear-piercing ceremony in the Mexican picture codices. They are said to be for dispatching an enemy and are usually made from the tibia of a cassowary. The Perth Museum collection includes native string knotted bags, stone implements of an early type, glass spear heads, spear throwers, bullroarers, and the only known spear head of pottery; also pottery from Zuñi, Chiriqui, and Nicaragua, sent in exchange by the Smithsonian Institution, and ancient Patagonian arrow points, stone borers, incised pottery, etc. The serrated glass spear heads of Australia show the highest skill and are still made for sale by natives imprisoned at Broome on the northern coast.

The Adelaide Museum has rare, rudely-made native canoes, axes, quartzite daggers in sheaths, stone picks used for fighting at close quarters, and big stone axes a foot long, also native skulls, and a Pacific Islands collection including models of houses, and metal boomerangs from India and West Africa. The unwieldy stone axes are very heavy and were set in short handles of pliant wood split for the stone to pass through and fastened with resin, as in the case of tomahawks. The Melbourne Library and Museum contains Australian ceremonial objects of painted wood and feather decorations somewhat similar to those of the Hopi, on

which Baldwin Spencer is an authority; also petroglyphs, boomerangs, lillil (or waggera), shields, axes, and wedges. The Kenyon and Mahony collection has 10,000 stone implements showing a great variety of types from different places. At Portland, paleolithic types were found; on the Gouldbourne, chipped river pebbles; in the interior, where brittle stone implements were scarce, they were used and reused to make pigmy types. The Hobart Museum has the skeleton of the last Tasmanian. This state, like the others, prepared interesting handbooks, that contained much information about the natives, for the British Association for the Advancement of Science, which met in Australia in 1914. The Auckland Museum of New Zealand has much Maori ornamentation. An entire house has been reerected in the great hall, the interior walls finely carved in panels. Still finer are some panels and long pieces of carved wood from an old house that was taken down and the carved parts buried for safety during a war. Small wooden coffins shaped like fetishes and painted are shown, and there is a skeleton and the unfinished stone axes buried with it. There are many carved ceremonial clubs, and all shows evidence of a high state of art formerly prevailing among the Maori.

Drs. R. W. Shufeldt (member of the Royal Society of Melbourne), Swanton, Michelson, Folkmar, and others took part in the discussion. Special mention was made of a skull, probably Pleistocene, recently discovered in the Darling Downs, this being the oldest of human remains found in Australia. Many photographs brought from Australia were shown by Miss Breton, including views of a settlement of aborigines 40 miles from Melbourne; also arrow heads and other artifacts. Miss Breton also read printed and manuscript accounts of the natives as seen about 1830 by her father, a naval officer. He considered the Australians to be the lowest race he had met in any part of the world.

DANIEL FOLKMAR, *Secretary*

Meeting of April 18, 1916

At the 499th regular and 37th annual meeting of the Anthropological Society of Washington, Dr. John R. Swanton, President of the Society, read a paper on "The Influence of Inheritance on Human Culture."

The speaker began by stating that he would apply the term heredity to the inalienable things which the individual receives in body and mind through ancestors, and the term inheritance to alienable ideas and things which have been transmitted to him by the entire social body into which he was born.

The environment which one inherits, he went on to say, is of two

kinds, the environment of unaffected nature and the environment which previous generations have brought into being by their action upon nature. The direct action of nature has been much dwelt upon and would appear at first sight fundamental, but on inquiring what environment is we find that all depends upon the amount of environment which a people is able to grasp. Thus the same area may include tribes of very different planes of development, and the culture of succeeding generations in the same area may be wide apart. The history of man exhibits a constantly greater grasp of environment by most peoples of the earth, a grasp which extends farther and farther into the past, owing to improved methods of recording, and brings humanity more and more in touch with the future. Speaking in economic terms this heaped up wealth is the capital of humanity, with which more capital is created in the present, to be again transmitted. All of it is not, however, of social value. The ideas which come to us down the stream of time may be false and the institutions and other creations may be injurious. There is a conservative instinct which tends to preserve what is of no real utility, an instinct comparable in many ways with that biological conservatism which tends to preserve vestigial organs in animals. Many such elements seem to have resulted from the perversion of what was once of value, but others appear never to have had any excuse for being.

One of the most pernicious of all appears to be that which permits the ownership of a disproportionate share of world capital to limited or privileged classes. Monopoly in learning, however, has been gradually destroyed by the multiplication of books, journals, and other means of education, while monopoly in things still continues. We are "the heirs of all the ages" but too many of us are younger sons, and the owners of privilege always endeavor to transmit to their blood or business descendants as much advantage as possible. One set of privileges consists in patents of nobility and governmental privileges attached thereto. Another is the ownership of some economic necessity such as land, mineral or oil deposits, power sites, franchises involving control of means of communication or the furnishing of articles of general necessity or utility, the control of industrial establishments, and so on.

In connection with these various types of control it must not be forgotten that the value of each as a money-making proposition depends without exception on society, because if society did not endorse privileges and purchase commodities there would be no value in ownership. To this must be added the service which society performs in defending and preserving the source of income. Such considerations limit very much

our estimate of the service which even the most capable beneficiary of privilege performs, and when, under the action of our laws of inheritance, the source of income passes to another, the moral right of the heir, measured in terms of service, becomes much less. Nevertheless, it is possible that sources of income of the several kinds enumerated may descend indefinitely in particular strains of blood, and under such circumstances there appears to be little difference in position between those who enjoy titles of nobility and those who enjoy titles to industrial sources of income. The fact that control of income-yielding property may be ended by sale or bankruptcy does not alter the fact, so long as the *general* condition exists, any more than the banishment of a single nobleman and the confiscation of his possessions alters the fact of the existence of a titled nobility.

The ultimate solution of this question appears to involve one of two courses of action, either some method of binding together use and ownership so tightly that he who uses a thing will not be excluded from at least partial ownership in it, or ownership vested in the state or some other collective and immortal body, use being granted individuals during the limited period of their lives. The accumulations of human society, its capital, are primarily collective accomplishments and therefore society has a prior right to them. Whatever service the individual may perform he cannot properly maintain a vicarious right to compensation after his death in the persons of his descendants or successors.

Dr. John R. Swanton was re-elected President, and Mr. J. N. B. Hewitt, Treasurer of the Society. The following officers were elected for the ensuing year; Vice President, Mr. William H. Babcock; Secretary, Miss Frances Densmore; Councillors, Dr. Truman Michelson, Mr. Neil M. Judd, Mr. Francis LaFlesche, Dr. C. L. G. Anderson, and Dr. Edwin L. Morgan.

FRANCES DENSMORE, *Secretary*

ANTHROPOLOGICAL NOTES

THE ETHNOLOGICAL RESULTS OF THE CANADIAN ARCTIC EXPEDITION, 1913-1916

THE disaster which overtook the expedition at the very beginning of its career, when the *Karluk* was carried away in the drifting ice, left but one ethnologist to do the work for which two had originally been appointed. Consequently, instead of confining my attentions to the archeology, technology, and physical anthropology of the Arctic Eskimo, I found it necessary to take up also their language and sociology. Unfortunately I had never received any special training in linguistics. Moreover the first winter, owing to ice conditions, had to be spent in northern Alaska, amongst Eskimo who had already come under the influence of civilization and been the subject of special study by at least one ethnologist. It was not until the following year, in the late summer of 1914, that the southern part of our expedition reached its intended base amongst the Copper Eskimo, so that barely two years were available for work amongst these, the only branch of the Eskimo race which still retained its primitive mode of life unaffected by the great world beyond.

For the archeologist the country of the Copper Eskimo is barren ground. The people are migratory, with no permanent habitations; their winter settlements are merely assemblages of snow huts that melt and disappear in spring; in summer they live in tents of seal or caribou skin of which no traces remain save rings of stones which anchored down their edges. The dead are laid out on the surface of the ground and the remains scattered or destroyed by the ravages of the seasons and by the depredations of the ravens and the foxes.

On the Arctic coast of Alaska the case was different. There the natives built permanent homes of wood, and buried their dead beneath piles of logs. The ruins of their settlements can be found all along the shore. Extensive excavations were made at Barter Island on the sites of three ancient settlements, and a large number of ethnographical specimens unearthed which throw a flood of light on the condition of the Eskimo in this region long before the earliest explorers came to visit its shores. When the expedition was returning south, further archeological specimens were purchased at Barrow and Point Hope; it will be interesting to compare these with the specimens from Barter Island. In those early

days iron was unknown: all weapons were pointed with horn, bone or ivory, with flint, slate or more rarely jade. The two most important pursuits of the natives were whaling and caribou hunting. Pipes and fish nets had not then been introduced; labrets were found, but whether any were yielded by the ruins that appeared oldest at Barter Island has not yet been determined. Fragments of pottery were numerous: in fact the knowledge of how it was made still persists among the Eskimo of this region.

My anthropometrical instruments were lost on the Karluk and could not be replaced until 1914. Some 130 Copper Eskimo were measured, all adults, and descriptions taken of the character of the hair, eyes, cheekbones, etc. Most of this work was done in their snow huts during the winter months, when the scattered bands congregate together on the sea ice. In consequence, apart from the stature, body measurements were unobtainable. Nothing was observed which would indicate fusion with any other race, save that in two or three instances the features seemed to have a somewhat Indian cast. Light coloration in the eyes and beard which was noticeable in certain individuals seemed entirely due to secondary causes. A large number of photographs illustrating the physical features of the natives were taken both by myself and by Mr. Wilkins, the photographer of the expedition.

Special attention was paid to the material culture of the Copper Eskimo and a large collection made of their weapons, household utensils, and clothing. These are rapidly being changed through the influence of the western Eskimo and of the whites. Already the natives have an abundance of iron to replace their copper; rifles are beginning to supersede bows and arrows; European pots and tin cans take the place of stone pots; garments of cloth are in great demand; and even the style of the clothing is undergoing change. For this reason a special endeavor was made to procure numerous specimens of those objects which were most likely to suffer modification or disappear entirely.

Although the time spent amongst the Alaskan Eskimo was very brief, more success was attained in the study of their dialect than in that of the Copper Eskimo. At Barrow I was fortunate in securing for two months the services of a half-caste boy whose knowledge of English was much greater than that of the average of his class. A few folklore stories were written down in the native tongue, and a grammar worked out in considerable detail, accompanied by a small vocabulary. Amongst the Copper Eskimo, where no interpreter was available who possessed a knowledge of that dialect, the notes on grammatical structure are far

less complete. Here, however, a large number of native songs, both the ordinary dance songs and magic incantations, were recorded on a phonograph, and these have all been transcribed and translated. Amongst them are records of two shamanistic utterances, the oracles of the most powerful shaman in the region: amidst his words can be distinctly heard the running commentary maintained by his wife in the background.

The Copper Eskimo dialect would appear to be more akin to the dialect of the Mackenzie River natives than to that of Labrador; but, as in Baffin Land, so too amongst the Copper Eskimo there is a constant employment of nasal terminations instead of the proper grammatical ending. Another peculiarity of the Copper dialect is the continual substitution of the conjunctive mood for the simple indicative, an anomaly which proved quite a stumbling-block at first to the Mackenzie River natives in our employ.

A number of Alaskan folklore stories were obtained in English, and also some from Coronation Gulf. It would appear that not only is the material culture of the Copper Eskimo much simpler than that of the western natives, but their mythology and folklore is also much less varied and complete. It is not merely that the actual number of the legends known to the native is less, but even those which are known seem often but the surviving fragments of others which are recorded in a more complete form elsewhere.

Much information was obtained concerning the daily life of the natives in summer and winter, both by direct inquiries, but mainly by living in their midst, observing and taking part in the common routine. Much misapprehension has existed amongst ethnologists concerning their summer life, our knowledge of which has hitherto depended entirely on the statements of travelers who have come into momentary contact with them during their wanderings. I spent seven months, from early spring until the beginning of the ensuing winter, with a small band of natives on Victoria Land, sharing their life in all its details, living in the same tents, hunting and fishing with them to obtain our common food, and accompanying them in all their movements. The information thus acquired proved beyond doubt that the old theories concerning their social and religious life during this period are entirely erroneous, at least as far as this branch of the Eskimo race is concerned. While it is difficult, perhaps impossible, for a civilized person fully to understand the mental attitude of a savage people towards the phenomena of life, yet the many shamanistic performances which I witnessed, and in many cases took part in, leave a general notion concerning their religious life which cannot

be far from the truth. Broadly speaking, just as in Hudson Bay, so here too a distinction is made between denizens of the sea and of the land, which is revealed in practice in the form of taboos. But the distinction is by no means rigid, and many game taboos seem to be entirely independent, in some cases even contradictory.

D. JENNESS

THE SAN FRANCISCO SOCIETY of the Archaeological Institute of America and the Anthropological Section of the Pacific Division of the American Association for the Advancement of Science held a joint meeting in San Francisco on December 1 and 2, 1916. Miss Zelia Nuttall presided at these meetings. The program presented was as follows:

Morning Session, Friday, December 1, 10 a. m., at the Art Institute, California and Mason Streets, San Francisco.

1. LEO J. FRACHTENBERG, *Bureau of American Ethnology.*
 - (a) The Social Organization of the Quileute Indians of Washington.
 - (b) Some Aspects of Alsea Mythology.
 - (c) Linguistic Problems in Oregon and Washington.
2. MARTIN A. MEYER, *University of California.*
Some Land Laws in Ancient Israel.
3. A. V. KIDDER, *Department of Archaeology, Andover.*
The Excavations at Pecos.
4. SAXTON T. POPE, *University of California.*
The Archery of Ishi (Illustrated).
5. HECTOR ALLIOT, *Southwest Museum, Los Angeles.*
Some Prehistoric Uses of Asphaltum in Southern California. (By Title.)

Afternoon Session, Friday, December 1, 2 p. m., at the Art Institute, California and Mason Streets, San Francisco.

6. L. L. LOUD, *University of California.*
Archaeology of the Wiyot Territory (Illustrated).
7. HENRY RUSHTON FAIRCLOUGH, *Stanford University.*
Some Greek Vases at Stanford (Illustrated).
8. OLIVER M. WASHBURN, *University of California.*
New Light on the East Pediment of the Parthenon from a Vase in the Hearst Collections (Illustrated).
9. GEORGE HEMPL, *Stanford University.*
The State of Civilization in Earliest Indo-European Times.

Morning Session, Saturday, December 2, 10 a. m., at the Museum, University of California, Berkeley.

10. RICHARD THURNWALD, *Königliches Museum für Völkerkunde, Berlin.*
Psychological Research in New Guinea.
11. F. J. TEGGART, *University of California.*
History and Anthropology.
12. W. D. WALLIS, *Junior College, Fresno.*
Psychological and Statistical Interpretations of Culture.
13. LEONARD OUTHWAITE, *University of California.*
The Educational Value of Anthropology.

Afternoon Session, Saturday, December 2, 2 p. m., at the Museum, University of California, Berkeley.

14. T. T. WATERMAN, *University of California.*
Time Reckoning of the Indians north of Mexico.
15. J. ALDEN MASON, *University of California.*
The Primitive Religions of Mexico.
16. EDWARD WINSLOW GIFFORD, *University of California.*
Customs and Kinship terms.
17. A. L. KROEBER, *University of California.*
Religious Diffusion in California.
18. JOHN P. HARRINGTON, *Bureau of American Ethnology.*
Notes on Esselen.

DR. J. WALTER FEWKES of the Bureau of American Ethnology has returned from the Southwest, having spent four months in field work in New Mexico, Utah, and Colorado. During June he made a reconnaissance of sites of ruins near and remote from Gallup, New Mexico, and visited several undescribed prehistoric buildings near Navaho church, and the upper tributaries of the Chelly canyon; the former he ascribes to clans which later went to Zuñi.

He also made plans and photographs of the round pueblo called Fire House, situated fifteen miles east of Keam's Canyon, claimed by the Fire people of Walpi as one of the buildings constructed by their ancestors in their prehistoric migration from near Jemez, New Mexico, to the Hopi country.

He visited two large pueblos, one of which has walls standing approximately forty feet high, near Crown Point, in the same state. These hitherto undescribed pueblos are related to the magnificent ruins of the Chaco canyon and are no mean representative of these well-preserved structures. A fairly good collection of artifacts was made in the ruins above mentioned.

In October Doctor Fewkes made a hurried trip to the Uinta reservation in Utah, and found in Hill canyon, which had never previously been visited by archeologists, a number of undescribed buildings situated on top of lofty promontories overlooking the canyon. In some instances these buildings had been built on pinnacles of rock shaped like the so-called Snake Rock at Walpi, but of much larger size. Not only are the sites on which they are constructed characteristic but also their architecture is unlike that of ruins found elsewhere. He designates these ruins, "Mushroom Rock ruins."

Over three months was spent in intensive archeological work in the Mesa Verde National Park, Colorado, at the request of the Secretary of the Interior. Dr. Fewkes excavated and repaired one of the community houses of the Mummy Lake group, and brought to light a three-storied pueblo, 113 feet long by 100 feet wide, of rectangular form. He found it to contain four kivas, and not far from fifty rooms; one of the kivas, which is centrally placed, measures 32 feet in diameter. This is the first open-air community dwelling ever excavated in the Park and presents new data for theoretical discussions of the origin, age, and fate of the cliff-dwellers.

A large collection of artifacts obtained in this work has been deposited in the United States National Museum.

ANTHROPOLOGICAL FIELD WORK in the American Museum of Natural History for the year 1916, consisted chiefly in ethnological and archeological investigations in southwestern United States and archeological studies in Porto Rico and Venezuela.

Professor A. L. Kroeber of the University of California made a second trip to Zuñi giving special attention to social organization and town government. Mr. Leslie Spier made an archeological survey of the Zuñi Indian Reservation. A large number of sites were examined, sections of refuse heaps made, and data secured for the chronological classification of the sites.

Mr. N. C. Nelson spent most of the season in a general survey of the region between the Rio Grande and the Chaco. In addition, some stratigraphic data were secured from Pueblo Bonito, and the southwestern limit of glazed pottery distribution determined. Assisted by Mr. Earl H. Morris of the University of Colorado, Mr. Nelson began systematic excavations of the so-called Aztec Ruin near the town of the same name. The concessions for the excavation were secured from its owner, Mr. H. D. Abrams. It is the intention to carry this work to

completion, and to strengthen and restore the walls where necessary so that the ruin may be left in a more or less permanent condition. Early in the year Mr. Morris was engaged in a survey of certain ruins in the San Juan drainage, the work being supported jointly by the American Museum of Natural History and the University of Colorado.

Dr. P. E. Goddard visited the White Mountain Apache, giving particular attention to problems in social organization. Dr. Robert H. Lowie continued his work among the Hopi, on social organization and relationship terms.

Early in the year Dr. Herbert J. Spinden went to Venezuela making extensive trips inland and collecting archeological specimens and data for the formulation of a tentative chronological classification of archeological remains in that region. Later, he went to Porto Rico to take charge of the archeological work conducted by the New York Academy of Sciences. Here he gave special attention to pottery and shell-heaps. The shell-heap work resulted in tentative stratigraphic conclusions which, in conjunction with the observations upon pottery, give us an outline of cultural chronology for that island.

Miss Frances Del Mar spent the greater part of the year in New Zealand making studies in material culture and securing sketches and other data for the construction of a large habitat group in the New Zealand section of the American Museum. Mr. Howard McCormick visited the Indians of southwestern United States on a similar mission and in addition secured an interesting series of motion pictures dealing with ethnological subjects.

Dr. Clark Wissler spent part of the summer with Mr. James R. Murie in an investigation of Pawnee ritualism.

PROFESSOR STARR of the University of Chicago will sail from Seattle on January 5 for the Orient. He hopes to revisit the island of Yezo to study certain features of Ainu culture. In Japan he will investigate the religious and ceremonial aspects of culture. Three months will be spent in Korea, continuing the work on his *Handbook of Korean Ethnography*. In the autumn the expedition will turn southward to Siam and Cambodia, where the remainder of the time will be spent in studying and comparing northern and southern Buddhism, and in visiting and photographing famous ruins of temples. Prof. Starr plans to be absent a full year.

At the invitation of Dr. Sellards, State Geologist of Florida, a conference of geologists and anthropologists was held at Vero, Florida, from October 23 to 30, the object of the meeting being to examine the

locality near that place from which fossil human remains have been obtained. Those present at the conference were Dr. George Grant MacCurdy, Yale University; Dr. A. Hrdlička, U. S. National Museum; Dr. T. W. Vaughan, U. S. Geological Survey; Dr. O. P. Hay, Carnegie Institution; Dr. R. T. Chamberlin, University of Chicago; E. H. Sellards and H. Gunter, Florida Geological Survey; and I. M. Weills and Frank Ayers, of Vero. The reports of the conferees have appeared as a symposium in the *Journal of Geology* for December, 1916.

THE SCIENTIFIC EXHIBITION at the meeting of the National Academy in Boston on November 13, included the following anthropological exhibits: A. M. Tozzer, Race mixture in Hawaii; Charles Peabody, Prehistoric specimens from caves in France and Palestine; E. A. Hooton, Casts and reconstructions of ancient man; S. J. Guernsey, Cave exploration in northeastern Arizona; Oric Bates, Prehistoric Libyan remains.

DR. JOHN R. SWANTON of the Bureau of American Ethnology visited Chicago early in September to examine manuscripts in the Ayer collection of Americana at the Newberry Library. Some material of great interest for the study of the tribes of the southeast came to light, including the only known vocabulary of the Akokisa Indians and an entirely new Karankawa vocabulary.

THE ANTHROPOLOGICAL SOCIETY OF PHILADELPHIA resumed its regular meetings for its fourth year, with Dr. W. Max Müller as president and Mr. E. P. Wilkins as secretary. The Society now has a membership of twenty. The first paper of the year was presented on November 18, by Dr. Müller, on *The Humorous Experiences of an Africanist*.

MR. ALANSON B. SKINNER is engaged in archeological work in eastern Costa Rica for the Museum of the American Indian, Heye Foundation. Mr. Skinner's special mission is the investigation of the deep tombs in the region of Las Mercedes. He will later make an archeological reconnaissance in the Talamanca country near the frontier of Panama.

MR. M. RAYMOND HARRINGTON has for some time been at work for the Museum of the American Indian, Heye Foundation, in the excavation of ancient burial places near Ozan, Hempstead County, Arkansas. Many new and remarkable objects have been discovered, and a notable collection of pottery vessels has been obtained.

PROFESSOR MARSHALL H. SAVILLE was engaged during the last summer in completing the archeological field work on the Pacific coast of Ecuador for the Museum of the American Indian, Heye Foundation.

The expedition carried on excavations along the banks of the Rio Mataje just over the border from Colombia.

MR. SAMUEL J. LOTHROP has been appointed Director of the Peabody Museum Central American Expedition for the coming year. On the return of Mr. and Mrs. Lothrop from an archeological trip to Porto Rico they will leave for Guatemala and Honduras.

MR. WILLIAM H. HOLMES of the U. S. National Museum visited in October the Detroit Art Museum, at the request of Mr. Charles Moore, Director, and spent a week classifying, arranging, and labeling the collections in ethnology and archeology.

MR. THEODOOR DE BOOY of the Museum of the American Indian, Heye Foundation, has commenced an archeological survey of the Danish West Indies. He is at present exploring ancient village sites on the Island of St. Thomas.

MR. S. J. GUERNSEY continued his explorations for the Peabody Museum in northeastern Arizona during the summer. He explored caves and cliff-dwellings in the Chin Lee Valley and in Marsh Pass.

DR. TRUMAN MICHELSON of the Bureau of American Ethnology has returned to Washington from successful field work among the Fox Indians of Tama and some of the Algonkian tribes in Oklahoma.

A BRONZE BUST of the late Professor Putnam has been presented to the Peabody Museum by Mr. John B. Stetson, Jr., of Philadelphia.

DR. A. M. TOZZER spent the summer in the Hawaiian Islands where he measured three hundred Hawaiians and mixed Hawaiians.

DR. ALEŠ HRDLIČKA of the U. S. National Museum attended the Lake Mohonk Conference, Oct. 18-20.

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